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PRESENT STANDARDS OF HIGHER EDUCATION IN THE UNITED STATES

By GEORGE EDWIN MACLEAN
FORMERLY PRESIDENT OF THE STATE
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- No. 6. Graduate work in mathematics in universities.
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- No. 8. Examinations in mathematics.
- No. 9. Mathematics in technological schools of collegiate grade.
- No. 10. Bibliography of education for 1909-10.
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- No. 12. Training of teachers of elementary and secondary mathematics.
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- No. 15. The educational system of China as recently reconstructed. H. E. King.
- No. 16. Mathematics in public and private secondary schools.
- No. 17. List of publications of the United States Bureau of Education, October, 1911.
- No. 18. Teachers' certificates (laws and regulations). Harlan Updegraff.
- No. 19. Statistics of State universities, etc., 1910-11.

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By GEORGE EDWIN MACLEAN, 1850-
FORMERLY PRESIDENT OF THE STATE
UNIVERSITY OF IOWA



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LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,

Washington, December 9, 1912.

SIR: For many years there has been carried on in the United States by various national and State organizations a vigorous agitation for a clearer definition and improvement of standards in higher and professional education. Committees and commissions have labored and reported. Sometimes these reports have been published and given wide circulation; in other cases they have been quite inaccessible to persons engaged in the study of educational standards. The need for a comprehensive and judicious discussion of the development of standards in education has been keenly felt and often expressed by individuals, institutions, and licensing or standardizing agencies, such as State boards of education and of medicine. The history of the work of the American Medical Association and of the Carnegie Foundation for the Advancement of Teaching, for example, in elevating the standards of medical education is illuminating for all who are concerned with the process of bettering educational standards, no matter what the particular field of their effort may be.

Among the organizations laboring for this definition and improvement of standards in large sections of the country or in the whole Nation are the National Association of State Universities, the Association of American Agricultural Colleges and Experiment Stations, the Association of American Universities, Association of American Medical Colleges, the North Central Association of Colleges and Secondary Schools (typical of sectional associations), and the National Conference Committee on Standards of Colleges and Secondary Schools. In the activities of all of these Dr. George Edwin MacLean, formerly chancellor of the University of Nebraska and for many years president of the State University of Iowa, had an important part. He has been a leader in much of the wise and constructive work of these bodies, and few men in the country are so well equipped as he by training, experience, insight, and accurate judgment to present such a survey as that contained in the manuscript which I am transmitting. Because it is pertinent to matters now much discussed by educational workers, and because it contributes valuable information in permanent form for establishing a better perspective and for mapping out further progress, I recommend its publication as a bulletin of this bureau.

Very respectfully,

P. P. CLAXTON,
Commissioner.

The SECRETARY OF THE INTERIOR.

PRESENT STANDARDS OF HIGHER EDUCATION IN THE UNITED STATES.

INTRODUCTION.

MOVEMENT FOR STANDARDS.

The battle of standards is perennial. We have thought it characteristic of our age. The moment, however, whether in matters mechanical or spiritual, when the thing passes from the individualistic to the social stage and a certain degree of development is reached, standards are precipitated. In all religions, creed and orthodoxy mean standards. In philosophies, principles and systems mean standards. In government, fundamental laws and codes are established standards. In higher education, whose watchword is "freedom of thought, of teaching, of learning, and of administration," when it crystallizes in institutions, standards to be used and not to be abused become a necessity.

Our age makes standards imperative. The oneness of modern civilization brought about by invention, by commerce, and Christianity has accomplished the beginnings of the realization of a Republic of Letters, if not of the federation of the world. Mechanical standards must be international. A standard gauge for railway tracks had to come. A common monetary basis had to be found. Naturally, applied education in the professions made the first demand for standardization. Systems of theology, international law, medicine as the science of physiology and psychology applied to the prevention and cure of disease, and all the applied sciences ranging the globe around are driven to standardize. The world-wide interchange of thought, exchange of scholars, and migration of students, last of all, bring the institutions of higher learning to call for recognized standards.

WORLD STANDARDS.

Dr. Elmer E. Brown, former United States Commissioner of Education, well anticipates the "world movement" in standards in the Report of the Commissioner of Education for 1908 (p. 10):

One can not permit the educational standing of one's own institution or State or Nation to be left in question before the rest of the world, and if it is not what it should be to command the respect of the world, it must be improved without delay. In its

highest form this sentiment would go further, and demand that our institution or State or Nation shall have such undoubted educational standing as shall enable it to do its part in determining the world standard in education, for there can be no doubt that we are to have a world standard and that it is already taking shape. This standardizing movement is no more inevitable than is the reaction against it. * * * In the American contribution to the world standard there shall be insistence upon freedom for such variability as would assure to a people universal opportunity in the present and unlimited progress in the future. But with this position fully secured the need for defined standards remains. It is at bottom the permanent need of scholastic honesty. The standardizing movement in our education is the pure-food movement in our spiritual world. It is necessary indeed to the soundness of our educational freedom and experimentation.

In pursuance of this policy, Commissioner Brown in his report for 1910 (Vol. I, pp. 1-11) sets forth a national programme of education, and tells of the inauguration within the Bureau of Education of the work of specialists in school administration, in higher education, and in land-grant colleges. His views of a world standard, elaborated in his address "American Standards in Education and the World Standards" (Science, new series No. 30, pp. 417-27), are an initial classic upon the subject.

The import of standards and the advance of them in higher education will appear from a reference to some periods in the history of standards in certain typical colleges.

STANDARDS IN COLONIAL COLLEGES.

They were derived directly from England, as the history of Harvard shows. President Everett said:

The course of studies, limited, it must be owned, was copied we have reason to think from that which was pursued at the time in the parent country; and the literary honors of the newly established institution were declared to be conferred *Pro more Academicarum Anglicarum*. (Addresses at Inauguration of the Hon. Edward Everett, LL.D., April 30, 1846.)

The first entrance requirements of the freshman class at Harvard are gathered from the laws passed in President Dunster's time (1642-1646). They read:

When any scholar is able to read Tully or such like classical Latin author *ex tempore* and make a speech from Latin, in verse and prose *suo (ut aiunt) Marte* (as they say, by his own exertions), and decline a number of paradigms of nouns and verbs in the Greek tongue, then may he be admitted into the college, nor shall any claim admission before such qualifications. (Historical sketch of Harvard University, by Wm. R. Thayer, Cambridge, 1890, p. 31.)

The curriculum was as follows:

The first year.—Logic, physics, etymology, syntax, and practice of the principles of grammar.

The second year.—Ethics, politics, prosody and dialects, practice of poetry, and Chaldee.

The third year.—Arithmetic, geometry, astronomy, exercises in style, composition, epitome, both prose and verse, Hebrew and Syriac.

In every year and every week of the college course every class was practiced in the Bible and catechetical divinity, also in history in the winter, and nature of plants in the summer. Rhetoric was gotten by lectures in every year, each student required to declaim once a month. The scholars read the Scriptures twice a day; had to write or epitomize the Sunday sermon, and were frequently examined as to their own religious state.

Dating from President Dunster's administration was the regulation:

The scholars shall never use their mother tongue except that in public exercises of oratory or such like they be called to make them in English. * * * They that expect to proceed Bachelors that year be examined of their sufficiency according to the laws of the college; and such as expect to proceed M. A. to exhibit their synopsis of acts required by the laws of the college. (Ibid.)

The requirements for graduation by the same regulation were:

Every scholar that on proof is found able to read the original of the Old and New Testament into Latin and resolve them logically, withal being of honest life and conversation, and at any public act hath the approbation of the Overseers and Masters of the college, may be invested with his first degree. (Ibid., p. 32.)

The undergraduate three years' course was extended to four years in 1654. The general nature of the college curriculum remained unchanged during the seventeenth and early eighteenth centuries. In 1726 a report of Tutors Flint, Welstead, and Prince gives us the subjects studied, and the textbooks and the program (p. 32).

(1) While the students are freshmen they commonly recite the grammars (Greek and Latin) and with these a recitation in Tully, Virgil, and Greek Testament on Monday, Tuesday, Wednesday, and Thursday in the morning and forenoon; on Friday morning Dugard's or Fornaby's Rhetoric, and on Saturday morning Greek, and towards the end of the year they dispute on Raum's Definitions, Monday and Tuesday forenoons.

(2) Sophomores recite Burgersdicius's Logic and a Ms. called New Logic in the mornings and forenoons; and toward the latter end of the year Heereboord's Meletemata and dispute Monday and Tuesday in forenoon. Continue also to recite the classic authors with Logic and Philosophy; on Saturday mornings they recite Wollebius's Divinity.

(3) The junior Sophisters recite Heereboord's Meletemata, Mr. Norton's Physics, Moore's Ethics, Geography, Metaphysics, in the mornings and forenoons, Wollebius on Saturday morning, and dispute Mondays and Tuesdays in the forenoon.

(4) Senior Sophisters besides Arithmetic recite Allsted's Geometry, Gassendus's Astronomy in the morning; go over the arts toward the latter end of the year, Ames's Medulla on Saturdays, and dispute once a week.

Harvard represents in all essential particulars the standards of all the Colonial colleges.

STANDARDS IN THE FIRST HALF OF THE NINETEENTH CENTURY.

Material changes from the almost stationary standards of the Colonial colleges appear in the first half of the nineteenth century. Entrance examinations continued as the method of admission, but they were mostly oral, and were neither "searching nor extensive."¹

As the practice of speaking Latin fell into desuetude the amount of Latin and Greek required to be read was greatly increased, and examinations became more thorough and rigorous. Mathematics was first made a requisite for admission in 1803, and then only so much as related to the rudiments of arithmetic. Geography was added in 1807. In 1816 an examination was required in the whole of arithmetic, and to this was added in 1819 a trifling amount of algebra. Caesar was first required for admission in 1836-37. From that year until 1866-67 there were only very slight changes in the requisitions for admission to Harvard. (Ibid.)

The continuance of the terms for admission of the Colonial colleges, with a noteworthy sign of oncoming changes in offering an option for Greek, appears in the action of the board of trustees in 1793 in opening Williams College. The act reads:

That each person who applies for admission be able to accurately read and parse and construe to the satisfaction of the president and tutor Virgil's *Æneid*, Tully's *Orations*, and the *Evangelists* in Greek. Or if he prefers, to read and pronounce with a tolerable degree of accuracy Hudson's *French Scholar's Guide*, *Telemachus*, or some other approved French author. (History of Williams College, by Calvin Durfee, Boston, 1860, p. 66.)

The laws adopted by the trustees required the following courses of study "so far as it may be convenient:"

The first year.—English, Latin, Greek, and French languages.

The second year.—The several languages in part, arithmetic, geography, algebra, geometry, mensurations, conic sections, rhetoric, and logic.

The third year.—Trigonometry, navigation survey, natural philosophy, astronomy, and chemistry.

The fourth year.—Metaphysics, ethics, history, natural law, civil polity, and theology. (Durfee, pp. 354, 355.)

Almost as much Greek and Latin is now (1860) required for admission as was formerly required for graduation. Geography, English grammar, and arithmetic formed a part of the early college course. Geography was dropped in 1831, arithmetic in 1837, and English grammar in 1839. (Durfee, p. 355.)

The natural sciences received but little attention at Williams College previous to 1816. Prior to 1812 the college had but little philosophical and no chemical apparatus. Prof. Silliman earlier at Yale had developed laboratory instruction in chemistry. Prof. Chester Dewey, of Williams, was given a leave of absence to take a short course under Prof. Silliman. (Durfee, pp. 357-358.) In 1816-17

¹ Hist. of Higher Educ. in Mass., by George Gary Bush, Ph. D., Bu. of Educ. Cir. Inf. No. 6, 1891; Contribution to Amer. Educ. Hist., H. B. Adams, 13, Gov. Pr. Office, 1891, p. 151.

Prof. Dewey began to teach botany, mineralogy, and geology in connection with chemistry. (*Ibid.*, p. 372.) In 1817 lectures on mineralogy, geology, and botany were given by Amos Eaton to such members of the college as chose to attend. (*Ibid.*, pp. 358-360.) Prof. Eaton was among the first in this country to study nature in the field with his classes. He prepared the way for geological surveys. His zeal for popular knowledge as an "itinerating lecturer," organizing classes in several of the larger towns in New England and New York, gives us an anticipation of university extension. Following Dewey and Eaton, Prof. Albert Hopkins, among the first in the United States, inaugurated as early as 1835 scientific expeditions (p. 376).

The fundamental idea of the curriculum of the standard college in the first half of the nineteenth century, accentuated by President Mark Hopkins's individuality, is nowhere better stated than in his alumni address in 1843. He says:

An indigenous idea here, as it must have been elsewhere, which we have of late attempted to realize is that of making the college studies have the impression and effect of a *system* on the mind of the student. Leaving the power of expression, whether by writing or speaking, out of the question, we divide our course into the languages and mathematics, physical science, and man as he is in himself, and in his relations to his fellow creatures, and to God, pursuing mathematics and languages in the usual way, also physical sciences, that it be first physical man and endeavor to give an idea of every organ and tissue of the body. We then take the intellectual man and investigate first and classify his several faculties; then the grounds of belief and the processes of the mind in the pursuit of truth, with an explanation of the inductive and deductive logic, then the moral nature, together with individual and political morality, comprising a knowledge of constitutional history and of the rights and duties of American citizens; then the emotional nature as it is and the principles of fine arts, then natural theology and the analogy of the natural and the moral government of God. (Alumni address by Mark Hopkins, D. D., Boston, Aug. 16, 1843, president of the college (Williams), pp. 31-32.)

The progress of standards in the colleges in this period is referred to by William Cullen Bryant in a letter of his in 1859, in which he says:

The standard of scholarship in Williams College at that time [1810, when he entered] was so far below what it now is that I think many graduates of those days would be no more than prepared for admission as freshmen now.

The diversity of standards in the colleges at this time, according to popular estimation, is shown by his letter. He speaks of students being dropped from Williams and as admitted to Union. He was one of those not satisfied with the degree of scholarship attained at Williams, and he himself at the end of the sophomore year obtained an honorable dismissal with the intention of going to Yale. (Durfee, p. 108.)

Signs were not lacking of the on-coming in the second half of the century of the battle concerning the elective system in place of the required system that had prevailed. The prominent causes were

the increase of students who were not preparing for the ministry, the prevalence of the post-Revolutionary American spirit, and the development of the natural and applied sciences. At Harvard in 1824 all studies were required, except that instructors might "choose as a substitute for 38 lessons in Hebrew and Syriac between chemistry and fluxions. French and Spanish being extra, attendance upon them was voluntary." By the revised statutes in 1826—

a student could attend any modern language for the first third of the freshman year in place of certain specified courses in Greek, Latin, topography, Hebrew, and natural science, and a senior might also substitute natural philosophy for a part of intellectual philosophy.

In practice the one development in which an elective system was fairly tried was in the French and Spanish languages and literature, then under the charge of Prof. George Ticknor. (Thayer, p. 34.)

The following scheme, adopted in the year 1841, shows the extent of the elective system (p. 35):

First year.

Prescribed: Mathematics, Greek, Latin, history.

Elective: None.

Sophomore year.

Prescribed: English, grammar and composition, rhetoric and declamation, one modern language, history.

Elective: Mathematics, Greek, Latin, natural history, history, chemistry, geology, geography, use of globes, and any modern language, so far as taught in the university.

Junior year.

Prescribed: English composition, one modern language, logic, declamation, physics, psychology, ethics, forensics, history.

Elective: Same as sophomore year and a more extended course in psychology and ethics.

Senior year.

Prescribed: Rhetoric, English composition, political economy, constitutional law, forensics, theology, history, declamation.

Elective: Political ethics, more extended course in physics and any of the elective studies above enumerated.

At Yale under the elder President Dwight the new learning, that is, the recognition of English literature as a classic side by side with the Greek and Latin classics, was a departure that caused much comment. The standard required curriculum with the slightest possible recognition of options for the period may well be represented by the course of instruction in the catalogue of Yale for 1822. The four years' course is divided each year into three terms, or sessions.

FRESHMAN CLASS.

First term.	Second term.	Third term.
Livy. Adams' <i>Romæ Antiq.</i> Mebbus' <i>Arithmetic</i> , revised. Murray's <i>English Grammar</i> .	<i>Græca Majora</i> , historical parts. Day's <i>Algebra</i> .	<i>Græca Majora</i> , cont. Morse's <i>Geography</i> , begun. Murray's <i>Grammar</i> , reviewed.

SOPHOMORE CLASS.

Morse's <i>Geography</i> , cont. Playfair's <i>Euclid</i> , begun. Horace, begun.	Euclid, finished. Horace, finished. Day's <i>Mathematics</i> , Pts. II and III. Cicero de <i>Officiis</i> , begun.	Homer's <i>Iliad</i> . Day's <i>Mathematics</i> , Pt. IV. Conic sections and spherical geometry. Jamison's <i>Rhetoric</i> . Cicero de <i>Officiis</i> , De <i>Senectute</i> , and De <i>Amicitia</i> .
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JUNIOR CLASS.

Spherical trigonometry. <i>Græca Majora</i> , cont. Enfield's <i>Philosophy</i> , begun. Cicero <i>Oratore</i> , begun.	<i>Græca Majora</i> , Vol. I, finished. Enfield's <i>Philosophy</i> , cont. Cicero <i>Oratore</i> , cont. Tacitus, omit <i>Annals</i> .	Enfield's <i>Astronomy</i> . Tyler's <i>History</i> . Fluxions, Greek, or Hebrew, at option.
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SENIOR CLASS.

Blair's <i>Rhetoric</i> . Hedge's <i>Logic</i> . Locke's <i>Essays</i> .	Paley's <i>Natural Theology</i> . Stuart's <i>Philosophy of Mind</i> .	Paley's <i>Moral Philosophy</i> . Paley's <i>Evidences of Christianity</i> .
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Yale has been the steady protagonist for a prescribed curriculum, as Harvard has been the leader in experiments with the elective system. The rise, progress, and decline of the first notable experiment in the elective system began in 1824 and closed with the first half of the century, and is well summarized by Bush (p. 167).

To Prof. George Ticknor who occupied the new chair of modern languages from 1816 to 1835, and to Judge Story, the honor is principally due for the inauguration of the elective system. In the years 1825-26 and 1826-27 a new arrangement of studies was effected by which three hours a week throughout the course, with the exception of the first and third of the freshman year, was given to elective studies. These hours could be devoted in the freshman year to Greek, Latin, and modern languages; in the sophomore year to Greek, Latin, mathematics, and modern languages; in the junior year to Greek, Latin, mathematics, modern languages, and Hebrew; in the senior year to Greek, Latin, mathematics, modern languages, chemistry, mineralogy, and geology.

In 1830, in order to secure "a more thorough education in Greek and Latin, mathematics, and rhetoric," the study of modern languages was postponed till the beginning of the sophomore year.

By a regulation adopted in 1838, mathematics ceased to be a required study after the freshman year, and the standard of scholarship was believed to have been so greatly elevated in this department by the introduction of the new system of electives that in 1843 the experiment was extended to Greek and Latin. During the four years from 1843-44 to 1847 the sophomores had 5 hours of required work in rhetoric, history, and philosophy; the juniors 6 hours required in philosophy, physics, and logic; the seniors 8 hours of required work in ethics, physics, rhetoric, political economy, and the Constitution of the United States.

All the remaining hours of required work were given to elective studies. [Therefore by 1850 the elective system had reached a high stage of development, with reaction.] In President Everett's report for the year 1847-48 we find that "during the year all the studies of freshman and sophomore years, including mathematics and French, were required studies. This change was the result of a compromise of the opposite views prevailing in the faculty on the general question of the expediency of continuing required and elective studies in a system of collegiate education.

In 1849-50 the ancient order of things had been so far restored that, with the exception of one elective of 3 hours in the junior and senior years, all the studies were required. President Sparks, in his report for that year, uses the following language: "This system (elective) was attractive in theory, but in framing it the consideration was not sufficiently weighed that what was gained in one study was necessarily lost in another. The system was subjected, however, to a fair and patient trial. In practice it never fulfilled all the expectations of its framers, and it soon began to fall into partial disfavor."

Again, in his report for 1851-52, he remarks: "The voluntary system, as it is called, is still retained to a certain extent, rather from necessity than preference."

At the moment of the downfall of the elective system at Harvard, as will be seen in the section upon the third quarter of the nineteenth century, Brown University took it up in a radical form.

Reference to the appropriate later chapters of this bulletin will show that this was the period of the organization and segregation of the professional and technical schools and the setting up more distinctly of their standards.

STANDARDS IN THE THIRD QUARTER OF THE NINETEENTH CENTURY.

This is a markedly transitional period, making stationary the advances of the first half century, but preparatory to the practically revolutionary period of the last quarter of the century. The requirements for admission were essentially stationary, as a comparison of the terms of admission to Williams College in 1850 and 1875 will show. In 1850 candidates for admission to the freshman class were examined in geography, vulgar arithmetic, and algebra through simple equations; in English, Latin, and Greek grammar (including prosody, the Latin grammar of Andrews and Stoddard, and the Greek grammars of Sophocles or Crosby were used); in Cicero's selected orations, the whole of Virgil, Cæsar's Commentaries, or Sallust; Jacob's, Colton's or Felton's Greek Reader, and in the Greek Testament.

In 1875-76 the requirements were the same with the exception of the addition of the outlines of Greek and Roman history, two books of geometry, Arnold's prose composition as far as the passive voice. The Greek and Latin requirements were made more specific, evidently in the interest of more intensive work. Seven instead of all of Cicero's selected orations, the Georgics, and six books of the Æneid instead of the whole of Virgil; four books of Cæsar's Commentaries in place of Cæsar's Commentaries or Sallust. The Greek require-

ment is increased as specifying four books of Xenophon's *Anabasis*, and one book of Homer's *Iliad*, with an option in place of the four books of *Anabasis* of 120 pages of Goodwin's *Greek Reader*. The *Greek Testament* is omitted. The "continental" method of pronunciation of Greek and of Latin has been introduced.

As from the beginning, testimonials of good moral character for admission are required, and matriculation still means something, the catalogue reading:

A probation of six months before the students are matriculated is required, during which time they are subject to all the laws and regulations of the college.

A somewhat new refrain still sung to this very day in all the colleges is found in the sentiments—

many who applied for admission are imperfectly prepared in the English studies, particularly in arithmetic and geography. As these studies are not pursued in college, it is necessary that the preparation of them should be full and thorough. (Catalogue of 1850.)

From 1847 to 1867 the elective system was in abeyance in Harvard, and in 1856 the institution made the three-hour courses in Latin and Greek, formerly elective, required studies in the junior year. But growing interest in the study of philology, philosophy, history, and above all in physical and natural sciences, compelled the college to make a second trial of the elective system. Such changes were made in 1867, equaling the elective system as it existed in 1843 to 1847. (Bush, p. 168.) The standard college curriculum of this whole period was in the main required, and is well represented by the course of instruction in the Williams College catalogue for 1850-51.

COURSE OF INSTRUCTION.

FRESHMAN CLASS.¹

First term.	Second term.	Third term.
Combe on Health and mental education. Odes of Horace. Xenophon's <i>Memorabilia</i> (Robbins' edition). Algebra. Arnold's Latin prose composition.	Livy. Homer's <i>Iliad</i> . Euclid, 4 books.	Livy, continued. Cicero de <i>Senectute</i> . Herodotus and Thucydides. Algebra, concluded. Latin composition, continued.

SOPHOMORE CLASS.²

Horace, satires and epistles. Euclid finished. Logarithms and trigonometry. Cicero de <i>Officiis</i> . Rhetoric. Latin composition, continued.	Euclid reviewed. Hedge's <i>Logic</i> . Mensuration, navigation, and surveying. Woolsey's Greek tragedies.	Spherical trigonometry. Coffin's Conic sections and analytical geometry. History. Plato's <i>Georgics</i> .
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¹ Declamations and translations are required daily throughout the year. Greek and Roman antiquities are studied in connection with the languages throughout the course, and the following books are recommended for reference: Adams' *Roman Antiquities*, Butler's *Atlas Classica*, Anthon's *Classical Dictionary*, Eschenburg's *Manual*, Smith's *Dictionary of Greek and Roman Antiquities*.

² Translations, declamations, and compositions daily throughout the year.

COURSE OF INSTRUCTION—Continued.

JUNIOR CLASS.¹

First term.	Second term.	Third term.
Wayland's Political economy. Demosthenes' select orations, Champlin's edition. Olmstead's Natural philosophy. Hopkins' Evidences of revealed religion. Quintillian begun.	Quintillian, continued. Tacitus. Olmstead, continued. Botany.	Chemistry. Astronomy. Fluxions, French or German, at the option of the student. Compositions on philosophical sub- jects.

SENIOR CLASS.²

Campbell's Philosophy of rhet- oric. Anatomy and zoology. Stewart's Elements of intellectual philosophy.	Wayland's Elements of moral science. Story on the constitution. Paley's Political philosophy. Kames' Elements of criticism.	Kames, continued. Butler's Analogy. Paley's Natural philosophy.
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¹ Disputations and themes alternately, by divisions, weekly, during the first and second terms. Declamations daily throughout the year.

² Vincent on the catechism every Saturday forenoon. A critical exercise in composition every Friday forenoon. Disputations or compositions weekly by divisions. Declamations of their own compositions weekly in the chapel during the first and second terms.

This quarter century is the one of transition from textbook methods of instruction to what is in the next period known as the laboratory method. The Williams catalogue of 1875 has a section picturing this transition. It is entitled "Instruction."

For the arrangement of the several branches of instruction, and for the time devoted to each branch, we refer to the *Order of studies* subjoined.

While instruction is chiefly given in connection with textbooks which afford the easiest and most certain means of acquisition to immature minds, the textbooks are supplemented by lectures and the student is made to feel, in a more immediate way, the influence of the instructor. The examinations on all points presented by lectures are as full and critical as upon those learned from textbooks.

Each department is provided fully with those accessories which aid in making knowledge complete, vivid, and practical. Historical and classical subjects are illustrated by maps, models, and photographs. Mathematics is applied by the use of instruments in the field. Anatomy and physiology are taught by means of the manikin, skeleton, and anatomical preparations. Even the abstract subjects of mental and moral science have been found capable of receiving additional clearness and enforcement by use of the blackboard.

In the languages opportunity was afforded to those who wished to pursue their studies beyond a regular course. In rhetoric and elocution written and vocal exercises supplemented the textbooks and lectures, and private criticism was given. In physics it was believed that with its apparatus and other equipment the department was in a favorable condition to satisfy all the growing demands of this important science. In chemistry, instruction was conducted with full experiments, and in astronomy the study of the textbook was accompanied by lectures, by practical illustrations in the observation, and by instruction in the use of instruments. In natural history and geology much was made of the cabinet, herbarium, and collections.

During this time the examination system was made more thorough. The predominance of oral examinations had given way to that of written examinations, and the biennials and quadrennials to annuals. The Williams catalogue for 1875-76 reads:

Examinations of all classes are held before the close of each term on the studies of that term, and before the close of the third term of each year there is an examination in writing upon all the studies of that year.

Brown University carried forward the radical movement from which Harvard fell back, and led the preparatory movement for the changes with reference to electives, and realized a curriculum of three or four years and multiplication of degrees.¹

The regular degrees conferred in the university shall be bachelor of arts, bachelor of philosophy, and master of arts.

The degree of bachelor of arts is designed especially for those who wish the different professions and yet from circumstances are unable to pursue a complete course of liberal education. In order to render it open to such students, the number of studies is limited, and a large liberty of choice granted that they may be enabled to select such studies as will better enable them to prepare themselves for a particular profession.

The candidate may have been proficient in:

1. Two ancient languages for two years, mathematics, English literature, and two other courses of one year.
2. One ancient language for two years, two modern languages, mathematics for two years, English literature, and two other courses of one year.
3. One ancient language for two years, mathematics for one year, one modern language, English literature, and four other courses of one year.

The degree of bachelor in philosophy is designed for students intended for pursuits of active life. The corporation wishes to make the requirement for getting it such as will confer a high degree of intellectual culture without the necessity of studying ancient languages. For this degree the candidate must be proficient in two modern languages, the mathematics of two years, English literature, and three other courses of one year each. Natural philosophy may in this degree be substituted for the mathematics of the second year.

A student who attends two years for each course of science applied to the arts, or chemistry applied to arts, or agriculture, and in either of them obtains a testimonial of proficiency may be a candidate for the degree of bachelor of philosophy, by obtaining testimonials of proficiency in one modern language, the course of English literature, and three other courses of one year each.

The degree of master of arts is intended for students who desire a full course of liberal education. To become a candidate for this degree one must obtain certificates of proficiency in the courses of ancient languages for two years, modern languages for one year, mathematics for two years, natural philosophy, English language and rhetoric, chemistry and physiology, history and political economy, intellectual and moral philosophy.

He must be also examined in the ancient languages, in natural philosophy, and in three other studies of one course, to be selected by the faculty; and he shall not be entitled to a degree unless his answers attain to 25 per cent of the maximum established by the faculty.

¹ Laws of Brown University, enacted Aug. 1, 1850, p. 17; summarized from text, with omissions.

The candidate for this degree may be allowed to substitute a third year in an ancient language for a second in mathematics, or a third year in mathematics for a second in an ancient language, or to substitute one modern language for a year in an ancient language, or for a year in mathematics.

It is the design of the corporation to require for the degrees of bachelor of arts and bachelor of philosophy an amount of study which *may* be accomplished in three years, but which *may*, if he pleases, occupy four years and to require for the degree of master of arts an amount of study which *may* be done in four years, but which, if generously pursued, may occupy him to advantage much longer.

At the close of this period conservative colleges like Princeton and Yale had yielded somewhat to the elective system in the upper classes, but with solemn safeguards, as the catalogue of the College of New Jersey, 1874-75 (p. 23), will show:

During the last two years of the course students have an opportunity of selecting to a certain extent the studies which they will pursue. These electives, chosen at the beginning of the college year, and for the entire year, will, when chosen, be equally obligatory with the required studies.

On the second day of the first term, at 12 o'clock noon, the members of the junior and senior classes meet in the chapel to declare in writing their choice of elective studies and to be enrolled in the several departments.

Qualitative standards were cherished, although that equality of departments had been attained (*ibid.*, p. 24) which had been earlier denied to the newer studies in comparison with the ancient or primary departments like Greek and Latin. The Princeton catalogue mentions the examinations in the several departments as—

counted of equal value on the scale of grades. In computing the final grade of a student his average grades of former years are combined with those of his final examinations.

Students whose final grade is above half of the maximum are ordinarily recommended by the faculty for degrees.

Students who stand high in the class, in addition to their degrees, may also receive by vote of the faculty Commencement orations indicative of general or special excellence. * * * Philosophical, classical, physical, metaphysical, ethical, historical, literary, *belles-lettres*, French and German orations are awarded to students eminent respectively in the corresponding departments. In awarding all literary honors and distinctions, regard is had by the faculty to moral conduct of the candidates.

The master's degree, however, was practically universally conferred in course, as at Princeton (*ibid.*, 24), on "every B. A. of three years standing who in the interval had sustained a good moral character and pursued professional or other studies," and who had made application for the degree.

STANDARDS IN THE FOURTH QUARTER OF THE NINETEENTH CENTURY.

This is a period of such rapid evolution as to be almost revolutionary. It is the time of the appearance of genuine universities and of the confusion of collegiate standards by university notions. The standards of admission and scholarship become very stiff and

tend to be mechanical. The elective system prevails in many places in extreme forms. In a broad way it may be said that the college graduate of the middle of the century would not rank more than one entering the junior year in 1900. In other words, standards of admission and graduation have been advanced by two years. The great protagonist of the elective system was President Charles W. Eliot, the system marking great advances with reference to admission and graduation requirements and methods of instruction. The new admission requirements in English, adopted by Harvard in 1874, prescribing certain texts with reference to studies in composition and literature, were adopted by all the New England colleges, and by 1900, through the influence of various associations, by the leading colleges of the country.

The history of the entrance requirements during the 40 years preceding 1877 is discussed in President Eliot's report for the latter year. At Harvard in 1880, to obtain admission to the college, the candidate had prescribed for him "a minimum requisition in every study and a maximum requisition in two selected by him from four principal studies." In all, he was required to pass a satisfactory examination in 11 studies.

Examinations in French and German were adopted at Harvard in 1875, and in 1877 they were put among the advanced subjects on an equal footing with Latin, Greek, and mathematics. (Bush, p. 152.)

President Eliot's inaugural¹ has become a classic with reference to the methods of teaching, educational value of studies, terms of admission, the elective system, and standards of secondary schools and colleges.

The best result of the discussion which has raged so long about the relative educational value of the main branches of learning is the conviction that there is room for all in a sound scheme, provided that right methods of teaching be employed. It is not because of the limitation of their faculties that boys of 18 come to college having mastered nothing but a few score pages of Latin and Greek and bare elements of mathematics. Not nature, but an unintelligent system of instruction from the primary schools through the college, is responsible for the fact that many college graduates have so inadequate a conception of what is meant by scientific observation, reasoning, and proof. It is possible for the young to get actual experience of all the principal methods of thought. There is a method of thought in language, and a method in mathematics, and another of natural and physical science, and another of faith. The actual problem to be solved is not what but *how* to teach * * *. (P. 31.)

Whatever elementary instruction the school fails to give, the college must supply. The improvement of the schools has of late permitted the college to advance the grade of its teaching and adapt the method of its later years to men instead of boys. This improvement of the college reacts upon the schools to their advantage, and this action and reaction will be continuous * * *. (P. 32.)

Such inducements as the college can offer for enriching and enlarging the course of study pursued in preparatory schools the faculty has decided to give. The require-

¹ Address at the inauguration of President Eliot, 1869.

ments in Latin and Greek grammar are to be set at a thorough knowledge of forms and general principles; the lists of classical authors accepted as equivalents for the regular standards are to be enlarged; an acquaintance with physical geography is to be required; study of elementary mechanics is to be recommended, and prizes to be offered for reading aloud and for the critical analysis of passages from English authors. At the same time the university will take to heart the counsel which it gives to others. (P. 33.)

The increasing weight, range, and thoroughness of the examinations for admission to the college may strike some observers with dismay. The increase of real requisitions is hardly perceptible from year to year, but on looking back 10 or 20 years the changes are marked, and all in one direction * * *. (P. 36.)

When the gradual improvement of American schools has lifted them to a level with the German gymnasia, we may expect to see the American college bearing nearer resemblance to the German faculties of philosophy than now. The actual admission examinations may best be compared with the first examination of the University of France. This examination, which comes at the end of the French boy's school life, is for the degree of bachelor of arts or science. The degree is given to young men who come fresh from school, and have never been under university teachers; a large part of them never enter the university. Our young men who come to our examinations for admission to college are older than the average of French bachelors of arts. The examination tests not only gauge the capacity of the candidates, but also the quality of their school instruction; it is a great event in their lives, though not as in France marked by any degree. (P. 36.)

The examination is conducted by college professors and tutors who never had any relations with those examined. It would be a great gain if later college examinations could be as impartially conducted by competent examiners brought from without the college and paid for the service. If the examinations for the sciences, theology, medicine, and dental degrees were conducted by independent boards of examiners, appointed by professional bodies of dignity and influence, the significance of the degrees would be greatly enhanced. The same might be said of the degree of bachelor of laws, if it were not that this degree is at present earned by attendance alone and not by attendance and examination * * *. (P. 37.)

Only a few years ago all students who graduated at this college passed through one uniform curriculum. Every man took the same subjects in the same proportions, without regard to his natural bent or preference. The student had no choice either of subject or teacher. This is still the prevailing system in American colleges, and has vigorous defenders. It has the merit of simplicity. So had the school methods of our grandfathers—one primer, one catechism, one rod for all children. On the whole, a single course of studies, well selected for the average needs, seems to most Americans a very proper and natural thing even for grown men. (P. 39.)

These principles are the justification of the system of elective studies which has been gradually developed in this college in the last 20 years. At present the freshman year is the only one in which there is a fixed course prescribed for all. In the other 3 years more than half the time is filled with subjects chosen by each student from lists which comprise 6 studies in the sophomore year, 9 in the junior year, and 11 in the senior year. The range of electives is large, though there are some striking deficiencies. The liberty of choice of subjects is wide, but yet has very rigid limits. There is a certain framework which must be filled, and about one-half the material of the filling is prescribed. The choice offered to students does not lie between liberal studies and professional or utilitarian studies. All the studies which are open to him are liberal and disciplinary, not narrow or special. Under this system the college does not demand, it is true, only an invariable set of studies of every candidate for his first degree in arts, but its requisitions for this degree are nevertheless high and inflexible, being nothing less than four years devoted to liberal culture. (Pp. 40, 41.)

Despite the vigorous leadership of President Eliot, it took 17 years to accomplish the uncertain adoption of the elective system. Its privileges were handed down from class to class till at last they reached the freshmen. (Thayer, p. 24.) At length even they were extended, with limitations, to the high schools. In May, 1886, the struggle which was still going on in the college "between the Harvard of conservative progress and the Harvard of radical reaction" culminated in victory for the latter. The nature of the struggle and the alarm which it created among the constituents of the New England Association of Colleges can be best understood by reference to the paper signed by the presidents of Yale, Brown, Dartmouth, Williams, Amherst, Trinity, Wesleyan, and Boston Universities, and presented to the overseers of Harvard University. It was as follows:

To the Honorable and Reverend

The Overseers of Harvard College:

Whereas it appears from the public prints that your honorable body is soon to be called upon to consider a proposition so to modify the conditions of admission to Harvard College, and of promotion to the degree of bachelor of arts, that this degree will no longer be evidence that its bearer has been instructed in Latin and Greek; and

Whereas it is evident that the proposed change seriously concerns the bearers of this degree everywhere; and

Whereas it is our clear conviction that the introduction of such a change in the conditions and significance of the degree in your institution would injuriously affect every classical college in America, and the work which they are now able to do for the cause of a truly liberal education:

We therefore, representatives of the New England College Association—in which from the beginning Harvard College has been an honored participant, and with which the Harvard College faculty has lately cooperated in the securing of more uniform requirements for admission to all our colleges—do hereby earnestly and respectfully request your honorable body not to approve of the proposed changes until after procuring a formal expression of opinion upon the subject from the leading colleges of the United States.

As true friends of the venerable and flourishing institution of which you have the oversight, and as in some measure jointly responsible with yourselves for the educational standards and work and reputation of our country, we venture to present this respectful request and to hope that it will be received as evidence that in the fellowship of a common aim we are,

Most sincerely, yours,

But the advocates of the new policy which broke with the traditions of the past were in ascendancy, and no action appears to have been taken by the overseers with reference to this appeal. How the matter was regarded by some of the oldest and most honored colleges outside of New England is shown by a letter of Prof. A. F. West, Princeton College, to the Independent, New York, May 6 and 13, 1886. He says, among many other things, of the changed significance of the A. B. degree at Harvard:

It does not mean, nor does it include as part of its meaning, what it has always meant heretofore, and that is the completion of a common course of disciplinary studies. It does not then mean what the old college degree did; and to transfer it, with whatever

prestige the old degree gave, to label all sorts of attainment, is academic misrepresentation. If the comprehensive significance of the degree at Harvard needs the prestige of the old title to give it presumptive acceptance, then the reason for its transference is intelligible; but it is unique in educational history. If it does not need this, it is unfair to obscure a hitherto well-understood degree by destroying its old meaning. Let everything be labeled for what it is; and where it has meant one distinct thing for ages, let a new degree label the new education so that it may come out from under cover of the old title for inspection.

Per contra, President Eliot, in the Annual Report of Harvard College for 1888-89, declares that—

the changes in the requirements announced in 1886 were not intended to lower in the slightest degree the standard of admission, and have had no such effect.

The protagonist on the conservative side was President Noah Porter, of Yale. His protesting articles, gathered in the second edition of his book "The American Colleges and the American Public" in 1878, confirmed Yale and the overwhelming majority of the smaller colleges in standing fast through this quarter of a century in requiring Greek for admission, and in admitting to the curriculum a minimum number of electives, limited to the upper classes. President Porter rests a part of his argument upon the failure of the public to patronize and the colleges to continue the parallel and special courses of study substituting the modern languages for Greek and Latin, introducing a larger amount of what have been later known as the practical subjects. He cites the experiment of Amherst and Harvard in 1826, the University of Vermont in 1829, Brown in 1850, and the change of the scientific schools from teaching every student whatever he cared to study to a regular curriculum. Half unconsciously President Porter comes near indorsing what we now know as "the group system" as over against that of free electives. In combating President Eliot, he says (p. 21):

The election is not between courses of studies having an order and progress defined by obvious characteristics and controlled by some distinct purpose, but it is between one set of studies and another from term to term, according to the capricious or wise judgment of the student. In this particular Harvard falls behind most of the other universities and colleges which have adopted the elective system.

The apparent complete anarchy in the curriculum where practically absolutely free electives were offered was in part prevented in Harvard by the tradition of the institution in New England and by the requirements of prerequisites for certain courses. Leland Stanford, with the same apparent anarchy, relied upon the strong advisory system for the students. The tendency to the debasement of scholarship by a choice of "snap courses" was thus in part held in check. The greatest contribution of this period was the carrying through of the experiment with reference to free electives, bringing almost a universal reaction in the next period toward some form of the group system, and the adoption in the present period in leading institutions

of the group system. Michigan University and the State universities generally, with Cornell practically representing them in the East, brought the group system into general favor, the benefits of election being preserved in the election of the group without the perils of the election of individual courses.

The greatest contribution of this quarter of a century in the United States was the differentiation of the university from the college, which has cleared up in the first decade of the twentieth century many matters not only in the way of standards of secondary schools, colleges, and universities pertaining to admission and graduation, but also as to curricula, methods of instruction, etc., the details of which will be handled in succeeding appropriate chapters. In this period, and particularly marking its close and the opening of the first decade of the twentieth century, appeared associations and organizations as standardizing agencies. The conflicts of institutions, like Harvard and Yale, the diversity of standards, and the rich endowments brought a rapid consummation in one decade of the twentieth century of a century's preparation for something like universal standards. The decade promises to be an epoch introducing an era of peace and progress in education, succeeding the conflicts and conciliations the battle cries of which were the Ancients and Moderns, the Humanist and the Scientist, the Classical and the Practical, the Old and the New education.

CHAPTER I.

PRESENT STANDARDS OF LIBERAL ARTS COLLEGES.

ENTRANCE REQUIREMENTS.

UNIFORMITY OF ENTRANCE REQUIREMENTS.

The diversity of college entrance requirements in the last quarter of the nineteenth century brought a demand from the preparatory schools for more of uniformity. With the incoming of the elective system and of new subjects, particularly in the high schools, each college setting its own examinations increased the variations. The transfer of students from one college to another increased the difficulties. The attendance of students from wider areas, facilitated by the prosperity of the country after the Civil War and the conveniences for transportation, heightened the demand for uniformity. The New England colleges held various conferences, beginning in the early seventies. A comparison of college catalogues and examination papers was made at a conference of New England colleges at Trinity College in 1879.¹

In 1881-82 Prof. A. S. Hill, of Harvard, and Prof. Winchester, of Wesleyan, secured the adoption by their universities of common requirements in English. By 1885 four or five colleges had adopted similar requirements. The success of this movement for uniform requirements in English chiefly led to the formation of the New England Commission.² The Commission of Colleges in New England on Admission Examinations was established in 1886 for the purpose of attempting as far as possible to make uniformity of examinations admitting to college as far as requirements were the same.³ This commission was effective for some 15 years. Its experiences with a variety of forms of certificates led it to believe that the trouble was not so much with the form of the certificate as with the approval of the schools. The result was the establishment of the New England Certificate Board for the Approval of Schools. The colleges agreed they would receive no pupils from schools in New England which were not approved (p. 46). The fundamental principle of the board appears in this rule: "No school will be approved until it has shown, by the record which its students already admitted to college make, its ability to give thorough preparation for college" (p. 49).

The secondary school men made their activities felt through the proposition of the Massachusetts classical and high-school teachers'

¹ Carnegie Foundation, 3d an. rep., 1908, p. 94.

² North Cen. Assoc., proc., 1898, p. 80.

³ Proc. 18th an. conv. of Assoc. of Col. and Prep. Schs. of Middle States and Md., p. 45.

association in 1884 to the heads of the New England colleges for a conference with preparatory-school teachers. From this conference sprang the New England Association of Colleges and Preparatory Schools, the first organization of the kind.¹

In 1887, 15 colleges in Pennsylvania formed the College Association of Pennsylvania. The next year this association was enlarged and named the Association of Colleges and Preparatory Schools in the Middle States and Maryland "with the purpose of considering the qualifications for candidates for admission to the colleges and the methods of admission" (p. 95).

The North Central Association of Colleges and Secondary Schools was organized in 1895; also the Association of Colleges and Preparatory Schools of the Southern States. On the part of the colleges these associations have been reenforced by associations like the Ohio College Association, Missouri College Union, the Association of Colleges of South Carolina, and like associations in Kansas and Illinois.

The provincial and local associations led to the development of a national movement for uniformity in admission requirements, the first step for which was taken in the report of the Committee of Ten of the National Educational Association, appointed in 1892. "With uniformity in the secondary schools, uniformity in college entrance requirements would follow as a natural sequence."² In 1895 the National Educational Association raised a committee on college entrance requirements, whose report in 1899 suggested not only uniformity in requirements but also flexibility.

In these later days the Association of Collegiate Alumnae, formed in 1882, setting up scholarly standards in various sections of the country among women's institutions, contributed to the national movement. The Methodist Episcopal Church (North) was early in the field as a standardizing agency. The General Conference of 1868, stimulated by the great centennial movement of 1866, instituted a board of education.³ In 1892 the scope of the board was enlarged and a university senate was authorized to formulate a standard of requirements for graduation to the baccalaureate degree in church schools, and the board was authorized to apply this standard and classify as colleges such institutions as met the requirements. The board provided:

REQUIREMENTS RELATING TO THE PREPARATORY (PRE-COLLEGIATE) COURSES.

Before admission to regular membership in the college classes, candidates for any of the degrees below named, or for any similar collegiate degree, must have completed in a satisfactory manner one of the four following courses, to wit:

A. Pre-Collegiate Course for Candidates for the Degree of Bachelor of Arts (A. B.):

1. English (or other vernacular of the candidate). The equivalent of 2 hours a week for 2 years in class instruction.

¹ Third an. rep. Carnegie Foundation, p. 95.

² Ibid., p. 102.

³ Rep. Bd. Educ. M. E. Church, Gen. Conf., 1900, pp. 38-39.

2. Latin. The equivalent of at least 4 hours a week for 3 years, covering at least 4 books of Cæsar, 4 books of Virgil, and 6 orations of Cicero, or full equivalents of the foregoing.

3. Greek. The equivalent of at least 4 hours a week for 2 years, covering at least an elementary textbook, 3 books of Xenophon's *Anabasis*, and 3 books of Homer, or full equivalents of the foregoing. In a 3 years' precollegiate course the study of Greek is expected to begin with the opening of the second year, but if it be deferred until the opening of the third year the study must be continued an additional year in the college. If deferred until the candidate enters college, it must be continued 2 additional years—that is, until the end of the junior year.

4. Modern language. In case a modern language other than the candidate's vernacular is offered as a substitute for Greek, the minimum requirement shall be the equivalent of at least 4 hours a week of class instruction for 2 years.

5. Mathematics, beyond arithmetic. The equivalent of at least 4 hours a week of class instruction for 2 years, covering algebra through quadratics and the whole of plane geometry.

6. History. The equivalent of at least 3 hours a week of class instruction for 1 year.

B. Pre-Collegiate Course for Candidates for the Degree of Bachelor of Science (Sc. B.).

1. English (or other vernacular of the candidate). The same as in course A.

2. Other languages. The equivalent of at least 4 hours a week of class instruction for 2 years in any two of the following: Latin, Greek, German, French.

3. Mathematics. The same as in course A.

4. History. The same as in course A.

5. Science—physical, biological, or both. The equivalent of at least 3 hours a week of class instruction for 1 year.

C. Pre-Collegiate Course for Candidates for the Degree of Bachelor of Philosophy (Ph. B.):

1. English (or other vernacular of the candidate). The same as in course A.

2. Other modern languages. The equivalent of at least 4 hours a week of class instruction for 1 year.

3. Ancient language. Latin, the same as in course A, or Greek, the equivalent of at least 4 hours a week of class instruction for 3 years.

4. Mathematics. The same as in course A.

5. History. The same as in course A.

D. Pre-Collegiate Course for Candidates for the Degree of Bachelor of Letters (Litt. B.):

1. English (or other vernacular of the candidate). The equivalent of at least 4 hours a week of class instruction for 2 years.

2. Other languages. In any two of the following—Latin, Greek, German, French, Spanish, Italian—the equivalent of at least 4 hours a week of class instruction for 2 years.

3. Mathematics. The same as in course A.

4. History. The same as in course A.

It is further required that each of these 4 precollegiate courses extend through at least 3 years of not less than 32 weeks, each week including not less than 15 hours of class instruction. The remaining hours of the 15 required as a minimum must be filled with work more advanced than ordinary elementary studies.

The university senate in 1909 determined that after 1912 no institution "shall be officially recognized by the church as a college or university which does not require four years of preparatory work for admission to the freshman class."¹

The two most effective nationalizing agencies were the College Entrance Examination Board, organized in 1900, with its uniform

¹ The Christian Student, Vol. XI, Feb., 1910, No. 1, p. 18.

definitions of the contents of units and rating examinations, and the New England College Entrance Certificate Board, formed in May, 1902. The latter board has practically made the accrediting system, developed by the State universities, a national system, only 7 leading institutions now clinging to the examination plan of admission. The colleges in the New England Certificate Board naturally have come individually to accept such high schools as they see fit that are accredited by the great provincial associations and State universities.

Public-spirited private enterprise has reenforced the national movement for uniformity of standards by the founding in 1902 of the General Education Board, which gathered and classified the data concerning all institutions professing and calling themselves colleges, and stimulated by gifts those that gave promise of being standard institutions. In 1905 the gift by which the Carnegie Foundation for the Advancement of Teaching was launched incidentally brought about the study of standards and the requirement of certain standards for an accepted institution, which have established the definition of a college.

In 1906, springing out of the discussions of the examination, certificate, and accrediting plans of admission for colleges, particularly in the National Education Association and through the nationalizing influences of the National Association of State Universities, was established the National Conference Committee on Standards of Colleges and Secondary Schools. This committee, consisting of delegates from 9 of the great provincial associations and educational agencies, makes possible the coordination of standards and terms, and crowns the national movement.

The national movement for standards, largely carried forward by voluntary associations, since the State is the educational unit, has been powerfully promoted by the statutory enactment of standards by the great State of New York, followed by several other States, also by the influence of State universities in other States, and by the equivalent of statutory provisions by State boards of education or educational examiners. New York State has one of the first legal definitions of a college, later adopted by the Carnegie Foundation:

College defined: An institution to be ranked as a college must have at least six professors giving their entire time to college or university work, a course of four full years of college grade in liberal arts and sciences, and should require for admission not less than the usual four years of academic or high-school preparation, or its equivalent, in addition to the preacademic or grammar-school studies.¹

*College entrance diploma.*²—The history of State academic credentials covers a period of exactly 30 years. By a statute enacted in 1877 the board of regents was directed to establish academic examinations in the schools under their general control and thereby to furnish a suitable standard of graduation from secondary schools and of admission to college. In accordance with this law, the first academic diploma was issued June 5, 1880, and the first classical academic diploma February 20, 1883. The

¹ Educ. Dept. State of N. Y., Handbook 32, sec. 24, June, 1911.

² *Ibid.*, An. Rept., 1908, p. 237.

standard of these two credentials differed somewhat from that of the present time. The former required no study of foreign languages and presupposed only 3 years' work, while the latter, which has often been called a "college entrance diploma," covered a curriculum of 4 years, providing for the study of Latin, Greek, mathematics, and American history, but giving no recognition to English, science, or the modern foreign languages. In 1891 the course of studies preparatory to college was cut down to 3 years, and this limitation continued until 1895, after which date all secondary-school diplomas issued by authority of the board of regents were based upon a 4-year program of studies.

Although at the outset the classical diploma included only the subjects required for college entrance, it appears that in consequence of an irresistible demand for a more equitable recognition of English, science, and history, certain limitations were placed on the issuance of this credential which interfered with its usefulness as a means of admission to college. These limitations were expressed in a regents' rule whereby no academic or classical diploma could be issued to a student unless he had passed examinations in specified groups of subjects that compelled him to give at least one-eighth of his time to English and one-sixth respectively to mathematics, history, and science. The result was that the student intending to present the classical diploma for admission to college could obtain from the college only a partial recognition of the time given to the study of history and no credit for his training in science. The manifest purpose of this regulation was to secure symmetry of education in the secondary school and to discourage the establishment or continuance of courses of study that merely met the needs of college preparatory students and ignored other subjects of study deemed essential for a well-rounded education. It is now evident, however, that the dominating influence of the colleges over the courses of study in the public high schools has nearly, if not quite, disappeared and that the more modern subjects of study are no less firmly intrenched than the time-honored subjects of Latin and Greek. The usefulness of the classical diploma has been subjected to additional restrictions by the fact that, although nearly all the colleges now accept the modern foreign languages as an equivalent of Greek in college preparation, the board of regents up to the present time has declined to issue a classical academic diploma that does not include the study of Greek for 3 years.

To remove these barriers that stand in the way of students preparing for college, a college entrance diploma is issued.

*College entrance diploma.*¹—This diploma, which is in substantial agreement with the entrance requirements of all the colleges of the State, is designed to guide students preparing for college and to facilitate their admission. It will be issued only to such students in the schools as pass satisfactory examinations after giving to the study of each subject the amount of time required by the regents' rules. The grades of this credential will be differentiated in accord with those prescribed for the academic diploma. On its face will be indicated the subjects studied and the ratings obtained in examinations.

Requirements for a college entrance diploma.

Arts department:	Counts.	Science department:	Counts.
English.....	13	English.....	13
Algebra.....	7	Algebra.....	7
Plane geometry.....	5	Plane geometry.....	5
Latin.....	20	First foreign lang. (2 years)....	10
Second foreign lang. (2 years)...	10	Second foreign lang. (2 years)...	10
History.....	5	Physics.....	5
Electives.....	10	History.....	5
	<hr/> 70	Electives.....	15
			<hr/> 70

¹ Educ. Dept., State of N. Y., An. Rept., 1909, 436-439.

Possible electives.

	Counts.		Counts.
First foreign lang. (3d yr.).....	5	Advanced zoology.....	5
Second foreign lang. (3d yr.).....	5	Advanced algebra.....	3
Third foreign lang. (2 years).....	10	Solid geometry...}	5
Physics.....	5	Trigonometry...}	
Chemistry.....	5	History.....	3 or 5
Physiography.....	5	Drawing.....	3
Advanced botany.....	5	Advanced drawing.....	3

N. B.—The electives must conform to the admission requirements of the college which the student intends to enter.

Modifications of requirements for academic and college entrance diplomas.¹

By action of the regents on April 1, 1909, the requirements for academic and college entrance diplomas were modified so as to provide that the lowest grade of diploma shall be based upon a minimum passing mark of 60 per cent in each subject. This action was taken after much discussion in the department and in the State Examinations Board and after many conferences and prolonged correspondence with college authorities relative to the following requirements for academic and college entrance diplomas:

1. In general, candidates for diplomas must prepare for examinations in schools that have complied with the requirements of the State Education Department in respect to buildings, laboratories, laboratory equipment, libraries, and courses of study.

2. In the public high schools of the State instruction must be given by teachers of ascertained qualifications, licensed by the State Education Department or by local authorities, in accordance with regulations prescribed by the department.

3. In all secondary schools recognized by the State Education Department methods of instruction must have the approval of the department based upon the reports of official inspectors who regularly visit the schools.

4. The syllabuses or outlines in accordance with which studies are pursued have been prepared under the direction of the State Education Department by committees of well-known teachers in secondary schools and colleges.

5. All question papers for the semiannual examinations are prepared by committees consisting of 3 members each, viz, a representative of the secondary schools, a representative of the colleges, and a representative of the State Education Department. These committees are appointed by the Commissioner of Education, upon nomination of the New York State Examinations Board. All question papers are carefully reviewed by a committee of the State Examinations Board, known as the committee on final revision, which consists of 4 representatives of the State Education Department, 2 representatives of colleges, and 2 representatives of secondary schools.

6. All answer papers are read originally by teachers of the schools in which they are written and then forwarded to the examinations division of the State Education Department in Albany for rereading and rating by the examiners of the department. No paper is accepted or assigned credit for a diploma if its final rating falls below 60 per cent.

Papers written by students who are unable to produce certificates of instruction within approved schools for adequate time are not accepted upon a final rating of less than 75 per cent.

In view of the above-described exacting requirements, it was maintained that the academic and college entrance diplomas issued by the New York State Education Department are worthy of recognition by the colleges and universities for purposes of admission; and in recognition of the high standards of instruction and scholarship demanded by these requirements, the following-named institutions have agreed to

¹ Educ. Dept., State of N. Y., An. Rept., 1910, p. 256.

accept for purposes of admission diplomas issued by the New York State Education Department in accordance with the amendment of the regents' revised rules, in so far as the qualifications for those diplomas meet the requirements for admission to the several institutions. [Forty-three colleges, such as Amherst, Bowdoin, Columbia, Cornell, and Dartmouth, including 19 outside of New York State, already accept these diplomas.]

INCREASE IN ADMISSION REQUIREMENTS.

In 1906 the increase in admission requirements so drew the attention of the Schoolmasters' Association of New York and Vicinity that that association passed resolutions and submitted them to the College Entrance Examination Board:

Resolved, That in the judgment of this association college entrance requirements are at present too great in quantity to secure the best quality of preparation.

Resolved, That the College Entrance Examination Board be requested to revise its requirements by reducing the quantity in certain subjects. The particular modifications are:

- (1) Elementary algebra.—The omission of the subjects beyond quadratics.
- (2) Plane geometry.—The preparation of a syllabus containing the essential propositions and the restriction of original work to exercises based upon those propositions.
- (3) French and German (elementary and intermediate).—The revision of the lists of recommended books and the reduction of the number of pages to be read.
- (4) Physics.—A reduction in the amount of mathematical work demanded.
- (5) History.—The restriction of questions requiring "comparison and the use of judgment on the pupil's part" to such as are commensurate with the maturity of secondary-school students; the ending of the period of ancient history with the death of Diocletian (A. D. 305).

Resolved, That in the judgment of this association 15 points, as indicated on the attached scale, are all that may reasonably be required for admission by any college:

	Points.		Points.
English.....	3	Intermediate French or German.....	1
Algebra and plane geometry.....	3	History (each field).....	1
Latin.....	4	Solid geometry and plane trigonometry.....	1
Greek.....	3	Physics or chemistry.....	1
Elementary French or German.....	2		

Though the chairman of the board ruled "that the court had no jurisdiction," steps toward the unification of admission requirements were taken through the appointment of a committee on the definition of each subject and a committee to review the entire college requirements. The board brought about, by an instruction to its committees on definitions to review the definitions and to limit the same in harmony with the recommendations of the Schoolmasters' Association of New York and Vicinity, a provision for a cooperation of commissions with specialists.

The degree of uniformity in the requirements for admission to college may best be deduced from specimen requirements in 1912, taken from representative college catalogues or bulletins in different sections of the country. A comparison of these terms of admission with those in the quarters of the nineteenth century may be made. (Cf. pp. 10, 14, 18, 19.) The representative colleges selected are the

colleges of liberal arts in the 22 universities which are members of the Association of American Universities and 14 typical independent colleges.

ADMISSION REQUIREMENTS OF REPRESENTATIVE UNIVERSITIES AND COLLEGES.¹

Albion College, Albion, Mich., 1911-12: 15 units—7 required of all, plus 2 in foreign language.

Required: English 3, mathematics 2 or 3, physics 1, foreign language 2.

Electives 8, or 7 from above subjects plus history and usual sciences.

Also accepts work of best high schools of 12 grades.

Beloit College, Beloit, Wis., 1911-12: 15 units—8 required of all; condition of 2 units if candidate presents total of 14.

Required: English 2, mathematics 2, foreign language 2, history 1, science 1.

Electives in above subjects plus civics and economics, total 7.

Bowdoin College, Brunswick, Me., 1911-12: 14½ units—10 required, plus 4½ electives, either Greek or French or German 2.

Required for A. B.: English 3, mathematics 3, Latin 3, history 1.

Electives limited to 4½—foreign language, history, mathematics (including trigonometry), chemistry, and physics; advanced Latin urged. For B. S., 9 required, foreign language 2, electives 5½.

Carleton College, Northfield, Minn., 1911-12: 15 units required of all. Conditions permitted in 1½ units.

Required: English 4, mathematics 2 (algebra 1, plane geometry 1), plus, for B. A., Latin 2, and for B. S., foreign language 2, mathematics 1, science 2.

Colgate University, Hamilton, N. Y., 1911-12: 14 units—7 required of all.

Required: English 3, mathematics 3, history 1, plus, for B. A., foreign language 6 (including Latin or Greek), electives 1; for B. S., foreign language 4, science 1, electives 2.

Electives limited to above subjects plus chemistry, physics, botany, zoology, physiology.

Cornell College, Mount Vernon, Iowa, 1911-12: 15 units (unit equals 5 hours per week for 36 weeks)—for A. B., 13 required; B. S., 12½ required; B. S. in engineering, 11½ required.

Required for A. B.: English 3, Latin 4, foreign language 2, mathematics (algebra, plane and solid geometry) 3, history 1.

Electives: Civics ½, economics ½, science 1½, history ½ to 1½.

Required for B. S.: English 3, foreign language 4, mathematics 3, science 1½, history 1.

Electives: Foreign language, science, history, civics, economics, 2½.

Required for B. S. in engineering: English 3, foreign language 2, mathematics 3, history 1, science 1½, civics and economics 1.

Electives: History, foreign language, science, bookkeeping, manual training, drawing, 3½.

Grinnell College, Grinnell, Iowa, 1911-12: 15 units—7½ required of all.

Required: English 3, mathematics 2½, history 1, science 1, plus foreign language 4.

Electives from above subjects plus civics, economics, bookkeeping, drawing, manual training 3½.

Lafayette College, Easton, Pa., 1911-12: 15 units (requirements not stated in units) required of all: English, mathematics, foreign language, history, geography.

¹For definition of units as used in this statement, see p. 35.

Required: For A. B. course, Latin and Greek; for B. S. courses, physics or chemistry and a modern language.

Pomona College, Claremont, Cal., 1912-13: 15 units—8 required of all.

Required: English 2, mathematics 2, foreign language 2, history 1, science 1; plus for A. B., English or foreign language; for B. S., mathematics and science 2.

Electives in above subjects (including Spanish) and vocational subjects include drawing, music, commercial agriculture, industrial and applied arts.

Rutgers College, New Brunswick, N. J., 1911-12: 15 units (14 units technical B. S.)—8 required of all.

Required: English 3, mathematics 3 or 4, plus foreign language 7, 3, or 2, history 2 or 1.

Tulane University, New Orleans, La., 1911-12: $14\frac{1}{2}$ units—6 required of all, plus foreign language 2, history 2 or 1 or science 1. Admitted to partial standing on 12 units.

Required: English 3, mathematics 3, foreign language 2-5, history 2, science 1.

Electives include trigonometry, biology, free-hand drawing, shopwork.

Vanderbilt University, Nashville, Tenn., 1912-13: 14 units—6 required of all.

Required: English 3, mathematics 3; plus for A. B., classical language 7, history or science 1; for other degrees, foreign language 4, history and science 2, plus additional 2.

Wabash College, Crawfordsville, Ind., 1911-12: 16 units—11 prescribed.

Required: English 3, mathematics 3, foreign language 3, history 1, science 1.

Electives, "any subject taught in a commissioned high school."

Williams College, Williamstown, Mass., 1911-12: $14\frac{1}{2}$ or 15 units, of which $10\frac{1}{2}$ units are the same in all groups.

Required of all: English 3, history 1, Latin 4, mathematics $2\frac{1}{2}$, and 3 or $3\frac{1}{2}$ units of French, German, Greek, French and advanced mathematics, or German and advanced mathematics.

Also an elective subject—a language, science, or history.

University of California, Berkeley, Cal., 1912-13: 15 units—5 required of all (except 4-year engineering courses), plus foreign language 4, science 1.

Required: English 2, mathematics 2, United States history 1.

Electives include trigonometry, Spanish, industrial arts, agriculture, music.

Catholic University of America, Washington, D. C., 1912-13: 14 or 15 (?) units— $10\frac{1}{2}$ required, plus Greek $2\frac{1}{2}$, French 1, or French and German $3\frac{1}{2}$, or French or German with physics or chemistry 4. Required: English 3, mathematics $2\frac{1}{2}$, Latin 4, history 1.

Chicago University, Chicago, Ill. (See p. 45.)

Clark University, Worcester, Mass.: Purely graduate school.

Columbia University (including Barnard College), New York City, 1911-12: $14\frac{1}{2}$ units— $5\frac{1}{2}$ required of all, plus Latin 4 for A. B., and physics and chemistry 2 for B. S. (Columbia College), or science 2 for B. S. (Barnard).

Required: English 3, mathematics $2\frac{1}{2}$.

Electives include trigonometry, Italian, Spanish, shopwork, music.

Cornell University, Ithaca, N. Y., 1912-13: 15 units—I. Arts, sciences 4, and law, 6 electives. II. Agriculture, 6 electives. III. Architecture, civil and mechanical engineering, 4 electives.

Required: English 3 in all courses, foreign language 5 and 3, history 1 in all, mathematics 2 in all, plus (in III) mathematics 2.

Electives: In addition to the above—physics, chemistry, botany, zoology, biology, physiography, drawing, agriculture, manual training.

Harvard University, Cambridge, Mass., 1911-12: 26 old-plan points (1 point equals 0.6 of a unit as reckoned by the Carnegie Foundation, 26 points equal 16 units). Prescribed, 14; elective, 12; conditions may be allowed.

Required: English 4, modern language 2, history 2, mathematics 4, science 2; plus for A. B., ancient language 4; plus for B. S., modern language 2.

Electives: In subjects enumerated above and music, drawing, civil government, economics, for B. S. only, woodworking, blacksmithing, chipping, filing and fitting, machine-tool work. For new plan of admission, see p. 42.

Illinois University, Urbana-Champaign, Ill., 1911-12: 15 units—5½ prescribed for all courses, 9½ elective; college of arts prescribes, in addition, history 1, foreign language 3 or 4. For colleges of science and agriculture: Science 2. For engineering: geometry ½, physics 1. For music: History 1, foreign language 3, music 2.

Required: English 3, mathematics 2½.

Electives: Astronomy, botany, chemistry, civics, commercial geography, drawing, foreign language, geology, geometry, history, physics, physical geography, physiology, zoology, agriculture, bookkeeping, business law, domestic science, economics, manual training.

Indiana University, Bloomington, Ind., 1912: 16 units—prescribed, 11; elective, 5.

Required: English 3, mathematics 3, foreign language 3, history 1, science 1.

Electives: "Any subjects taught in a commissioned high school, and credited by said high school as a part of its regular 4-year course, will be accepted."

State University of Iowa, Iowa City, Iowa, 1911-12: 15 units—8½ required for liberal arts and 9 for applied science.

Required: English 3, mathematics 2½, one foreign language 2, history 1.

Electives: 6½ or 6 units.

Johns Hopkins University, Baltimore, Md., 1912: 16 units (?)—"Evidence of a satisfactory knowledge" of mathematics, English, history, Latin, Greek, or French and German, physical geography, or a science such as botany, chemistry, or physics, free-hand drawing. Applicant must furnish certified statements of the successful completion of courses in the subjects required. He will then be admitted to the matriculation examination.

Kansas University, Lawrence, Kans., 1911-12: 15 units—11½ prescribed, 3½ elective.

Required: English 3, mathematics 2½, foreign language 3, physical science 1, biological science 1, history 1.

Electives: English 1, mathematics 1½, foreign language 3½, physical science 2, biological science 2, history 3½, vocational subjects 3½.

Leland Stanford Junior University, Palo Alto, Cal., 1912: 15 units. "The university is prepared to recognize for entrance credit any subject having an established place in the secondary school curriculum in which adequate instruction is given and which is pursued to satisfactory results. No prescription, other than English, is made. Candidates desiring to study mathematics must obviously offer such elementary mathematics as is not taught in the university, and engineering students are expected to offer also solid geometry and trigonometry. Candidates desiring to study Latin should offer at least two entrance units in that subject."

University of Michigan, Ann Arbor, Mich., 1911-12: 15 units—8 required; 7 elective. May be conditioned up to 2 units.

Required: English 3, mathematics 2, science 1, foreign language 2.

Electives: English, mathematics, Greek, Latin, French, German, Spanish, history, physics, chemistry, botany, zoology, physiography, physiology, geology; not more than 3 units from group including agriculture, domestic science, drawing, manual training, commercial branches.

University of Minnesota, Minneapolis, Minn., 1912-13: 15 units—6 required; 9 elective; no conditions allowed.

Required: English 4, mathematics 2.

Electives: Mathematics 1, foreign language 2 or 4, history 3, economics 2½, American government ½, science 5 or 6; not more than 4 units from vocational group, 16½ or 19½.

University of Missouri, Columbia, Mo., 1911-12: 15 units—7 required; 8 elective; conditions allowed.

Required: English 3, mathematics 2, foreign language 2.

Electives: English 1, mathematics $2\frac{1}{2}$, history 4, civil government $\frac{1}{2}$, foreign language 2, science 2, agriculture, music, bookkeeping, 1 each; drawing, manual training, domestic science, 2 each; economics, commercial geography, $\frac{1}{2}$ each; only 4 units accepted in commercial and industrial subjects.

University of Nebraska, Lincoln, Nebr., 1912-13: 30 points (equivalent to 15 units; 1 point represents 1 semester hour). In terms of units, 9 required; 6 elective.

Required: English 2, mathematics 2, history 1, foreign language 3, science 1.

Electives: In addition to those above, "subjects taught in an approved manner in an accredited secondary school."

University of Pennsylvania, Philadelphia, Pa., 1911-12: 23 points (value of the point not stated ¹)—10 points are required; 13 elective.

Required: English 4 points, mathematics 4, history 2.

Electives: Mathematics 3 points, Latin 7, Greek 6, French and German 3 each, Spanish 2, science 8.

Princeton University, Princeton, N. J., 1911-12: For A. B., English, mathematics, Latin, Greek, modern languages, history required of all; for B. S. and Litt. B., Greek replaced by modern languages, adding mathematics or science.

Prescribed subjects are chosen from groups in the case of history, modern languages, and science.

University of Virginia, Charlottesville, Va., 1911-12: 14 units— $10\frac{1}{2}$ required for A. B.; $8\frac{1}{2}$ required for B. S.; others elective.

Required: A. B., English 3, mathematics $2\frac{1}{2}$, history 1, Latin 4. B. S., English 3, mathematics $2\frac{1}{2}$, history 1, 2 modern languages 4.

Electives: English 4, mathematics $3\frac{1}{2}$, history 4, Latin 4, Greek 2, German, French, Spanish 2 each, science 4, drawing 1, shopwork 1.

University of Wisconsin, Madison, Wis., 1911-12: 14 units—6 required; 8 elective. Students may be admitted without foreign languages, but language conditions must be met later.

Required: English 2, mathematics 2, foreign language 2.

Electives: English 2, mathematics 2, foreign language 4, history 4, civics 1, economics $\frac{1}{2}$, science 4, vocational subjects, not more than 4 units, optional (any subject not specified in electives) 1.

Yale University, New Haven, Conn., 1911-12: Candidates are admitted to the freshman class on passing a satisfactory examination in: (i) Latin; (ii) French or German; (iii) English; (iv) mathematics; (v) additional subjects, of which 4 out of a list of 12 must be offered. Since 1911, candidates have met the requirements also by passing with satisfactory grades the equivalent subjects in the examination set by the College Entrance Examination Board and presenting their board certificates for credit.

Additional subjects include: Greek, French or German, solid geometry and plane trigonometry, physics, chemistry, history.

UNIFORMITY AND UNITS OF ADMISSION.

The first notable effort toward securing uniformity of entrance requirements and definition of units of admission was a conference of New England colleges held in December, 1879. Since that date various efficient organizations have arisen to secure the needed co-operation between the colleges themselves and between colleges and secondary schools. Chief among these organizations are the Col-

¹ Designations and definitions of requirements are identical with those of the College Entrance Examination Board.

lege Entrance Examination Board, organized in 1900, made up of 29 representatives of universities, colleges, and schools of technology, and 9 representatives of secondary schools; the North Central Association of Colleges and Secondary Schools (1892) and its commission on accredited schools and colleges, the Association of Colleges and Preparatory Schools in the Middle States and Maryland, the Association of Colleges and Preparatory Schools of the Southern States, and the New England College Entrance Certificate Board (1902). To secure still further cooperation there was formed in 1906 the National Conference Committee on Standards of Colleges and Secondary Schools, composed of representatives of the organizations just mentioned, together with representatives of certain other bodies, like the Carnegie Foundation for the Advancement of Teaching and the United States Bureau of Education.

The result of this movement for uniformity has been the wide adoption of the definitions of requirements in various subjects recommended by national conferences, committees, and associations like those already mentioned. In fact, it may be said that these definitions have now come into common use by all sorts of institutions throughout the United States. The definition of a unit as formulated by the National Conference Committee on Standards of Colleges and Secondary Schools, October 9, 1909, adopted by the College Entrance Examination Board and approved by the associations of colleges and preparatory schools of the North Central States, of the Middle States and Maryland, and of the Southern States is as follows:

"A unit represents a year's study in any subject in a secondary school, constituting approximately a quarter of a full year's work."

This statement is designed to afford a standard of measurement for the work done in secondary schools. It takes the 4-year high-school course as a basis, and assumes that the length of the school year is from 36 to 40 weeks, that a period is from 40 to 60 minutes in length, and that the study is pursued for 4 or 5 periods a week; but, under ordinary circumstances, a satisfactory year's work in any subject can not be accomplished in less than 120 sixty-minute hours or their equivalent. Schools organized on any other than a 4-year basis can, nevertheless, estimate their work in terms of this unit.

Since the number of students taking the examinations conducted by the College Entrance Examination Board is so very large and represents so great a number of schools in every section of the United States, the syllabus or definition of requirements of this board is printed in full in Appendix A (p. 143). This represents the scope and nature of the preparation which the students in the secondary school must make in anticipation of the examination.

The method of admission by certificate, represented by the North Central Association of Colleges and Secondary Schools, is in con-

trast with the method of the College Entrance Examination Board. The former association, which antedates the latter in this important field, has enjoyed the fruits of the labors of committees of college and secondary-school men, and has made fuller recognition of the place in secondary-school curricula of the sciences and of the newer subjects in commerce, business, and manual training. The definitions of units and requirements of the commission of the North Central Association of Colleges and Secondary Schools for 1910, so far as they vary significantly from those of the College Entrance Examination Board, are presented in Appendix B. Duplication in the two syllabi thus presented has been avoided so far as possible without destroying their unity.

METHODS OF ADMISSION.

The last 20 years have witnessed a steady growth of the system of admission to college by certificate rather than by examination, especially in the State universities and in general outside of New England. At the same time the number of students taking the examinations of the College Entrance Examination Board has also enormously increased. An outline of these methods of admission, and of their administration by different institutions, presented in admirable form to the sixteenth annual meeting of the Association of Colleges and Preparatory Schools of the Southern States in 1910, is here reproduced in condensed form with omission of the comprehensive detailed bibliographical data.

I. Prevailing Methods of Admission to College.

(A) By examination—

- (1) Conducted by the individual institution, e. g., Yale, Harvard.
- (2) Conducted by the institution and its affiliated schools jointly, e. g., Chicago.
- (3) Conducted by a cooperative board, e. g., the College Entrance Examination Board.

(4) Conducted by the State, e. g., the New York State Education Department.

(B) By certificate—

- (1) From the schools approved by the individual institution, (a) without personal inspection of the schools by an officer of the institution (early method and unsatisfactory), e. g., Amherst, Williams, Cornell; (b) with inspection of the schools by officers of the college, e. g., the State universities of Michigan, California, Wisconsin, Illinois, Missouri, and Texas.

- (2) From schools approved by a collective agency, (a) without inspection of the school by an official agent, e. g., the new College Entrance Certificate Board; (b) with inspection of the schools by an official agent, e. g., the commission on accredited schools of the North Central Association of Colleges and Secondary Schools.

- (3) From schools approved by a State agency, e. g., Minnesota.

- (4) But no method of admission by certificate entirely eliminates the use of entrance examinations by the individual colleges for (a) candidates prepared by irregular or special methods; (b) candidates prepared by unaccredited schools; (c) candidates from accredited schools who do not come up to the certificate requirements.

Query: Under what circumstances is it proper that a college should admit students coming within this class to its examinations?

II. Rationale of the Methods of Admission.

(A) Historically, admission by examination is a system coeval with the universities themselves.

(1) It was evidently intended to determine fitness to profit by university instruction. Varying with time, place, and circumstances, examinations for entrance were more or less formal and arbitrary, more or less severe and thorough, more or less well contrived to eliminate the unfit and admit the desirable students.

(2) Within the last 30 years the purpose not only to determine fitness but to raise progressively the standard of preparation and to secure uniformity of requirements among institutions has become a conspicuous feature in the administration of the system of entrance examination by such institutions as Harvard and Yale and such organizations as the College Entrance Examination Board of the Association of Colleges and Preparatory Schools of the Middle States and Maryland, and similar institutions and bodies.

(B) But as the use of examinations grew more thorough and more definite in purpose, and they were more intelligently applied, the number of cases accumulated in which it was plain to see that the result was arbitrary and unintelligent and that teachers and candidates were resorting to educationally unsound methods of preparing for the test. This led some to repudiate examination by the institution or the board for entrance and to advocate the substitution of the opinion of the teacher who had prepared them, not however without the specification of certain criteria by which his judgment could be controlled and tested.

(1) The method of admission by certificate is effective, at least when well controlled, in eliminating the unprepared and in developing the standards of secondary school work.

(2) The method of admission by certificate promotes an increase in attendance. (a) It eliminates the formal entrance examination—always extra effort of very considerable proportions and generally looked upon as a great bugbear. (b) The articulating of the secondary schools with the colleges removes friction in the progress of the student, thus facilitating his progress. (c) Interest in going on to college is aroused, and particularly interest in going to that college whither many school friends in upper classes go on graduation and to which he can go so easily. (d) But it also gives an advantage in the obtaining of students to any college using it over another college maintaining the examination system; and among colleges using the system to the one applying it least exactly.

(C) Now, it is altogether too apparent that, for the past several decades at least, colleges have been laying great importance upon an increase in attendance. Accordingly, it has followed that college authorities are approaching the question of the methods of admission from two mutually conflicting standpoints:

(1) The improvement of the college standards, by eliminating the unfit and raising progressively the requirements for entrance.

(2) The increase in attendance. (a) "Bluntly stated, all the colleges are so anxious to get students that no system is lived up to." (b) Only rare instances occur of the opposite charge that colleges discriminate against the candidate of merely average ability.

(D) Finally, a synthetical study of the educational field has made prominent the idea of the relation of universities (an aggregate including professional departments, graduate schools, and a collegiate department), colleges, secondary schools, and elementary schools (whether private or public) in one comprehensive system; with approximate conformity to a standard within each grade and an articulation of each grade with those next to it on either side.

This brings to the surface the idea of admission requirements (or high-school graduation requirements) as an agency for standardizing the school in the system and not merely for the service of a particular college. The idea is of a standardizing agency

outside of and above the school, but the idea is incompletely worked out in any one system.

(1) Note the general movement to standardize colleges and collegiate departments of universities by establishing uniform entrance requirements.

Note that thus far the standard has been applied to the requirements for entrance to college rather than to the requirements for graduation.

(2) Note, especially in the States outside of the New England and the Middle States, the emerging of the State university as the head of the system.

(3) Note the efforts of State universities to develop, standardize, and articulate the high schools of the State (both public and private). Distinguish between the function of the college (State or private) to develop the schools as feeders and the function, especially of State universities, to develop schools as parts of a system of general public instruction.

(4) Note the efforts through State Departments of Education (New York and Minnesota) to develop, standardize, and articulate the high schools with the colleges.

* * * * *

The most effective systems are those which inspect at least as thoroughly as the universities of Michigan, California, Wisconsin, Illinois, Missouri, and Texas, and the State of Minnesota. This inspection involves:

(1) A report on the ability of the community to support a school; its willingness to do so; the buildings and equipment existing and in prospect; the curriculum; the number of scholars; the number, preparation, and experience of the teachers.

(2) Visits to the community and the school by the inspector to see that the ideas and the standards of the school board are at least as high as those which he is upholding, and to see that the work of the teachers in the classroom is good.

(3) Examination of classes by questions prepared, or at least approved, by the respective university officers or other central authority and answers graded by the university officers or by other central authority, through a series of years or intermittently; or, the submission of examination papers, prepared by pupils and graded by teachers, on the different subjects to the university authorities, when weakness is suspected.

The rivalry between the examination method of admission and some form of the certificate method became so great that in 1905 the topic was assigned in the department of higher education of the National Education Association, "Which is better, the western plan of admitting students to colleges and universities by certificates from duly inspected secondary schools, or the eastern method of admitting only by examinations conducted by representative boards or otherwise."¹

It was thought that one system would slay the other. The so-called eastern system is, of course, the Colonial or English, and the so-called western system is the German or Continental system of certification.²

¹ Proc. Nat. Educ. Assoc., 1905, p. 501.

² The testimony is marshalled from the best representatives of the different sides:

For the examination system—

Sch. Rev., Vol. IX (Dec., 1901), pp. 619-25, XII, 757; Proc. Nat. Educ. Assoc., 1901, 240 ff.

For uniform examinations and some form of certificate—

Educ. Rev., Vol. XXVI (Dec., 1903), pp. 440-456; (contra) Educ. Rev., Vol. XXVIII (Oct., 1904), pp. 304 ff.; Educ. Rev., Vol. XXII (Mar., 1901), pp. 286-300; Educ. Rev., Vol. XXII (Oct., 1901), p. 291.

For certificates—

Sch. Rev., Vol. X (Oct., 1902), pp. 615-619; Proc. 5th an. meeting of the N. Cent. Assoc. of Col. and Sec. Schs., 1900, p. 11; Nat. Conf. of Sec. Educ. Northwestern Univ., 1903, p. 94; Prof. T. Gregory Foster in the second report of the Alfred F. Mosely Commission, pp. 115-118; M. E. Sadler, Educ. Rev., Vol. XXI (May, 1901), pp. 497-515; Prof. A. S. Whitney, Sch. Rev., 1903, and An. Rep. Dept. of Interior, 1902, Commis. of Educ., Vol. I, p. 534; President Angell, An. Rep. Dept. of Interior, 1902, Commis. of Educ., Vol. I, p. 539.

Perhaps the latest illustration of the culmination of an accrediting system with a degree of uniformity carried into every detail is the adoption by the Iowa State Board of Education of the following scheme for accrediting and admission requirements for the State university, the State College of Agriculture and Mechanic Arts, and the Teachers' College:¹

There shall be a board known as the Board on Secondary School Relations, composed of the inspector of secondary schools, chairman, and three other members chosen, one from the faculty of the college of liberal arts of the State university, one from the faculty of the State College of Agriculture and Mechanic Arts, and one from the faculty of the State Teachers' College. The faculty representatives on this board shall be appointed by the presidents of the respective institutions and shall be approved by the State board of education.

* * * * *

The recommendations of this board shall be carried by its faculty members to their respective faculties and when approved by the three bodies they shall become operative, subject to the general regulations of the State board of education.

Full information concerning standards and processes of accrediting will be furnished by the inspector on request. A school desiring to be accredited shall file its application with the inspector. When requirements have been met, the work examined and approved by the inspector, and the school is prepared to graduate students under conditions prescribed, it may, on vote of the board on secondary school relations and approval of the faculties represented in that board, be recognized as an accredited school and assigned to the proper group.

* * * * *

Provisions shall be made for a system of scholarship reports, whereby copies of the records of all freshman students entering the said institutions from Iowa secondary schools shall be assembled in the office of the inspector of schools, thus affording opportunity for judging the degree of preparation for higher study gained by such students in the secondary schools. Private and denominational colleges desiring to cooperate in this shall be encouraged to do so.

Schools seeking accredited relations may demonstrate their preparation for such recognition both by meeting the standards, as determined by careful, sympathetic inspection, and by the ability of their graduates to pass the required entrance examinations.

Graduates of all nonaccredited high schools will be expected to pass the required entrance examinations on entering 4-year courses of collegiate grade in the said institutions.

It is understood that recognition as an accredited school insures credit without examination for work properly certified only so far as such work meets the specific entrance requirements of the department, division, or college to which admission is sought.

STANDARDS FOR ACCREDITING.

The standards for accrediting are essentially the same as those which have prevailed in Iowa for many years.

The course of study shall require of each pupil not more than 4 recitations daily, and shall rest upon an elementary course of not less than 8 years of 36 weeks each in length.

The number of daily periods of classroom instruction given by any one teacher shall not exceed 7, each to extend over at least 40 minutes. Fewer periods would be productive of a higher grade of scholarship.

¹ Iowa State Bo. of Educ., Bull. No. 1, 1911.

If all the teachers of a school are graduates of standard colleges, the school will be regarded as meeting the requirements for scholastic attainment of teaching force. If one or more teachers are not such graduates, the board on secondary school relations shall use its judgment in determining the sufficiency of the scholastic attainment of such teacher or teachers.

Laboratory and library facilities and the character of textbooks shall be adequate to the needs of instruction in the subjects taught.

The quality of instruction, the spirit of the school, and the conditions of the school buildings shall be such as to make possible satisfactory scholarship.

Note: Academies, seminaries, normal schools, and other secondary schools meeting the conditions set forth above may be accredited on the same basis as high schools.

GROUPING.

For purposes of administration in accrediting, schools are divided into three groups:

I.

Schools meeting the general standards and the following specific standards in addition:

1. At least 15 units for graduation.
2. A course of study meeting the requirements for unconditioned entrance upon all the 4-year collegiate courses in the said institutions.
3. The number of daily periods of classroom instruction given by any one teacher not to exceed 6, each to extend over at least 40 minutes in the clear.
4. The number of pupils not to exceed an average of 30 for each teacher.
5. A minimum teaching force of 4 teachers, exclusive of the superintendent.
6. The quality of the teacher's instruction and the character of the student's scholarship as determined both by inspection and by college records of graduates to be of notably high order.

II.

Schools not classified in group one, but meeting the general standards and the following specific standards in addition:

1. At least 15 units for graduation.
2. A course of study meeting the requirements for unconditioned entrance upon liberal arts or general collegiate courses in the said institutions.
3. Minimum high-school teaching force of 3 teachers, including the superintendent.
4. Minimum teaching force in the elementary grades, 5.

III.

Any school not included in the preceding groups, meeting the general standards and the following specific standards in addition:

1. At least 12 units for graduation.
2. Minimum teaching force, including the principal, 2.
3. Minimum teaching force in the elementary grades, 4.
4. Time for which schools in Group III are accredited limited to 1 school year.

Notes: 1. It is recommended that not more than 3 years' work be attempted unless the school is prepared to maintain a longer course on a thorough and scholarly basis.

2. It is understood that graduates from schools in Group III will present, either by examination or certificate, such additional credits as may be required by the institution to which admission is sought.

MODIFICATIONS OF THE EXAMINING AND CERTIFICATE SYSTEMS OF ADMISSION.

The examination system, which was universal for centuries, has been supplanted almost universally by some form of the certificate

system. The prominence, however, of the few institutions maintaining the examination system makes it still a living issue. Harvard, Yale, Princeton, Columbia, Lafayette, and Bryn Mawr are defenders of the examination system. The fault that may be found with either system stimulates inquiry. The dangers of uniformity and of mechanical and impersonal administration of either the certificate or examination system and the virtues and defects have resulted in new plans for admission, the authors of which resent naming them as combinations of the certificate, of accrediting, and examination systems. They are in truth promising evolutions of elements at work in the two plans. The formidable set of intensive written examinations in many subjects, given to large numbers of students at once, banished the personal element as much as the reception of unseen candidates for admission upon a mere paper certificate.

In 1908 Columbia moved to recover something of the personal contact between the professor and the entering student, with an opportunity for some recognition of individuality. Of the plan, President Butler said:¹

In assisting the student to make a transition from secondary school to college, it is in the highest degree important to bear in mind that the problem to be solved is a human problem. * * * Human beings are not to be measured by their attainments by the laws of mechanics.

Columbia displaced the university committee on entrance examinations and on admission by a committee on undergraduate admission, the chairman of which is a newly appointed officer whose specific duty it is to administer the affairs of the committee. The chairman was to confer with the secondary-school teachers and to acquaint himself especially with the character and proficiency of candidates for admission about whose qualifications for entrance there was any doubt.

The committee on undergraduate admission give weight in estimating the results of the candidate's entrance examination to the record of his school performance. They have power to admit candidates who have not entirely completed the stated requirements for admission, but who in the judgment of the committee are regarded as qualified to pursue to advantage the work for which they desire to register. The case of each student admitted conditionally is considered individually upon its merits.

A humane device, adopted much earlier generally, to relieve the candidates from the burden of many examinations taken at once, was the dividing of examinations into preliminary and final, with a possibility of at least a year or two between. The institutions, like those in the New England Certificate Board, receiving candi-

¹ Columbia Univ., An. Reps., 1909, 22-23.

dates upon certificates virtually accredited schools by the record made by the *intrants* in their college work, but lacked the knowledge of the schools given by inspection. The institutions accrediting schools upon inspection, admitting candidates on the certificate of their teachers, neglected at the beginning to test these schools by the work of *intrants* in the colleges. The earlier sharp division between high schools and colleges by which certain studies were labeled as high-school studies and others as college studies, a persistence of the time when Greek, Latin, and mathematics were the staple subjects for admission, wrought havoc and ill feeling when a wider range of subjects for admission prevailed. Of necessity some elementary disciplinary subjects must be begun in college and the following of sequences carries some high-school subjects to an advanced stage. In short, the disciplinary period of education covers the six-year period of the high school and the first years of college. The entering student seeking a liberal education of necessity, therefore, in accordance with his preparation must continue certain studies or elect others.

To meet these conditions by a natural evolution, there has appeared what is, in the writer's judgment, a happy fruition of the various plans of admission in the establishment of so-called "New plans" by Harvard and Chicago. Uniformity of admission requirements has brought about at least a unity as to many subjects, a common terminology, or units of measurement, a unifying of secondary and initial college education, an on-coming cooperation of secondary and collegiate teachers, and a recognition of the personality of the student. The Harvard plan is set out in a letter to head masters of secondary schools as follows:

NEW REQUIREMENTS FOR ADMISSION TO HARVARD COLLEGE.

Beginning in June, 1911, candidates for admission to Harvard College may apply for admission either by the plan used in the past or by the following alternative plan. This new plan does not take the place of the old plan; it provides another method of admission for good scholars.

To be admitted to Harvard College, a candidate—

- (1) Must present evidence of an approved school course satisfactorily completed; and
- (2) Must show in four examinations as explained below that his scholarship is of a satisfactory quality.

School Record. A candidate must present to the committee on admission evidence of his secondary-school work in the form of an official detailed statement showing—

- (a) The subjects studied by him and the ground covered.
- (b) The amount of time devoted to each.
- (c) The quality of his work in each subject.

To be approved, this statement must show—

- (a) That the candidate's secondary school course has extended over four years.
- (b) That his course has been concerned chiefly with languages, science, mathematics, and history, no one of which has been omitted.

- (c) That two of the studies of his school program have been pursued beyond their elementary stages, i. e., to the stage required by the present advanced examinations of Harvard College or the equivalent examinations of the College Entrance Examination Board.

The Examinations. If the official detailed statement presented by the candidate shows that he has satisfactorily completed an approved secondary school course, he may present himself for examinations in four subjects as follows:

- (a) English.
- (b) Latin, or, for candidates for the degree of S.B., French or German.
- (c) Mathematics, or physics, or chemistry.
- (d) Any subject (not already selected under (b) or (c)) from the following list—

Greek,	History,	Physics,
French,	Mathematics,	Chemistry.
German,		

These four examinations must be taken at one time, either in June or in September.

In announcing this plan, the committee on admission wish to point out that it differs in essential principles from the old plan now in use, and that therefore comparisons between the new requirements and the old will be misleading if any attempt is made to express the new requirements in the terms of the old. Under this new plan the college does not intend to prescribe in detail the school course of the boy who wishes to enter, either directly by naming and defining subjects, or indirectly by an elaborate system of rating the studies of a school course in points or units. On the contrary, the college accepts the judgment of a school as to a candidate's program, subject only to the general limitations stated above. It is not necessary, therefore, for a school to fit a candidate's course to detailed definitions of subjects. A good student who has had a rationally planned course in a good school should have no difficulty in proving his fitness for admission, even though his decision to come to Harvard be made late in his last school year. Under the new plan every school maintaining the kind of course indicated will be free to work out its own system of education in its own way. The college, on its part, undertakes only to test the intellectual efficiency of the boy at the time of his graduation from school. For this reason the examinations can not be divided.

A second important difference between the new requirements and the old is the emphasis put in the college examinations upon quality of work. The new plan contemplates examinations different from those now used with respect both to their character and the method in which they will be administered. It is hoped to secure a type of examination which shall be adapted to various methods of teaching, and which shall contain questions sufficient in number and character to permit each student to reveal the full amount and quality of his attainment. In administering examinations under this plan the committee will always consider examinations in connection with school records, and will endeavor to see not whether a candidate has done a certain prescribed amount of work in a certain way, but whether the general quality of the candidate's scholarship is satisfactory. If a candidate is admitted, he will be admitted without conditions; if he is refused admission, no credit will be given for examinations in the separate subjects in which he may show proficiency, and the refusal will mean that his school record and his college tests do not show that he has the scholarship which makes his admission to Harvard College desirable.

The admission of a candidate under this plan, therefore, depends upon good scholarship as shown in two ways—in his school work and in his college tests. He can not secure admission by scoring points or by working up examinations one or two at a time. He must have done good work in his school according to the testimony of his teachers, and he must meet successfully college tests at the time when he is ready to enter.

In introducing this plan, which departs considerably from schemes of admission now in general use, the college is already aware of various grave difficulties. It will doubtless be difficult to prepare a type of examination paper sufficiently flexible to fit various methods of instruction in various parts of the country, and to enable all candidates to exhibit the full amount and quality of their attainments. To accomplish this end the committee on admission are authorized to advise with school-teachers in regard to the preparation of papers and the methods and standards of marking; and they confidently hope for the cooperation of schools in working out a plan which they believe will serve the common interests of both schools and colleges.

While the new plan of Harvard was formulated only a few months before the June examinations in 1911, the reports indicate that the geographical distribution of applicants, which was one of the chief objects of the plan, was highly encouraging to the Harvard authorities. In June and September 185 applications were made; 46 were rejected because of defective school records. Of the 139 who were allowed to take the examinations prescribed by the plan, 83 were admitted and 56, or 40.2 per cent, were rejected. Of those who presented themselves under the old plan, 17.1 per cent were rejected and 8.1 per cent of the June candidates did not complete their examinations in September. Twelve States were represented under the new plan, which had no boys admitted under the old plan. The percentages of students admitted under the two plans in June and September, with regard to the schools from which they came, were as follows¹:

Students prepared in—	Under old plan.	Under new plan.
	<i>Per cent.</i>	<i>Per cent.</i>
Massachusetts.....	72	41
New England.....	85	47
Other Atlantic States.....	8.5	31
Schools west of the Alleghanies.....	4.5	21

THE UNIVERSITY OF CHICAGO PLAN.

Desiring to cooperate more effectively with the secondary schools, the University of Chicago has introduced essential modifications into its entrance requirements. These modifications are herewith set forth. In making the changes the university has had several distinct principles in mind, the more important of which may be briefly stated as follows:

Heretofore the university has admitted students from approved schools without examination. The schools were approved on the basis of inspection by a university officer. This practice will be continued. Schools not already on this list will, at their request, be inspected, and if approved will be put upon the list. The retention of the schools upon the list will thereafter depend upon the records made by the students sent to the university from the schools. It is intended to keep the school principals accurately and frequently informed of the records made by their students. It is also contemplated that, so far as possible, representatives of the schools may from time to time come to the university and visit those classes which continue most directly the work done in the schools. It is hoped in this way to secure a more intelligent cooperation than has hitherto been possible.

¹ Repts. of Pres. and Treas. of Harvard College. 1910-11, pp. 7-8.

The university recognizes the obligations which the high schools are under to serve their own communities in the most efficient possible way without primary regard to college-entrance requirements. It therefore desires to render as flexible as possible the conditions under which students may come to the university, and it proposes to set up only such requirements as seem indispensable to enable the university to continue with advantage the educational work begun in the schools. With this principle in mind, the university faculty has replaced the former schedule of requirements, designating a considerable number of specific subjects in which the student must have been prepared, with a plan which, save for a requirement in English, lays emphasis not so much upon specific subject matter as upon a certain amount of concentrated and continuous work in subjects selected by the students, or the school, from among the standard academic subjects taught in all high schools. The quantity of the work required is specified in the paragraphs below. The quality of the work the university expects to test by the record of the student after he comes to the university.

It is believed that sufficient flexibility has been introduced (1) to permit the schools to meet every reasonable demand of their own communities in the arrangement of their curricula, (2) to enable the student to enter college even though he decides late in his course to do so, and at the same time (3) to make it justifiable for the university rigidly to require of each student a full 15 units of entrance work. There will consequently be no admissions with condition under the new plan. * * *

Entrance requirements.

Students applying for entrance to the University of Chicago present by certificate from approved schools or by examination 15 units of entrance credits. Among these must be 3 units of English and in addition 1 principal group of 3 or more units, and at least 1 secondary group of 2 or more units. These additional groups may be selected from among the following subjects:

1. Ancient languages (Greek and Latin), it being understood that to make a group of 2 or 3 units the work must be offered in a single language.
2. Modern languages other than English; to make a group of 2 or of 3 units the work must be offered in a single language as under group 1.
3. Ancient history, mediæval and modern history, English history, United States history, civics, economics.
4. Mathematics.
5. Physics, chemistry, botany, zoology, general biology, physiology, physiography, general astronomy.

In group 5 not less than 1 unit may be offered in either physics or chemistry. Any combination of the subjects within each group is permitted.

Of the 15 units offered for entrance at least 7 must be selected from the subjects in groups 1 to 5. Not less than one-half unit may be offered in any subject.

The remaining 5 units may be selected from any subjects for which credit toward graduation is given by the approved school from which the student receives his diploma, but Greek, Latin, French, German (or any language other than English), mathematics, physics, and chemistry, if offered, but not as above under 1 and 5, must each consist of at least 1 unit. Latin may not be *continued in college* unless at least 2 units be offered.

Summary of entrance requirements.

Three units of English.

Three or more units in a single group, 1-5.

Two or more units in another single group, 1-5.

Two units in subjects selected from any of the groups 1-5.

(Total: Ten units in English and groups 1-5.)

Five units selected from any subjects accepted by an approved school for its diploma.

Not less than one-half unit will be accepted in any subject. Entrance with conditions not permitted.

The most striking change in this scheme, says Prof. Angell,¹ is found in the substitution of certain specifications regarding the *amount* of work which a student must bring to the university as contradistinguished from the particular subjects in which the credits must be offered. The *quality* of the work is to be tested chiefly by the college record of the student. The demand is for a certain amount of concentrated and continuous work in subjects selected by the student, or by the school, from among the standard academic subjects taught in all high schools. The one stipulated subject which must be presented is English, and this is required on the ground of its unique relation to all other subjects in the curriculum.

The university is confident that such freedom in admission will in no way impair the standard of its degrees, because for several years a rigid method of grading has been in force, by which inefficient students are inevitably eliminated very early in the course.

The first two years of the college course are designed to articulate in the most intimate way with the high-school course and to assure certain results by the end of the second year of college residence.

To secure an effective correlation of the high-school and the college work, it is provided that throughout the first year of his college residence the student shall pursue one subject which he has pursued in the high school either for two or for three years or which he has pursued throughout the whole of the final year of his school course.

In conjunction with the requirements for the "continuation work" in the first year are those which extend over the first and second years. During this period two courses in English and one in public speaking must be taken. The student is also obligated so to arrange his work that either in the high school or in the first two years of college he shall have completed the equivalent of two units in each of the following four groups of subjects: (1) Philosophy, history, social science; (2) modern language other than English; (3) mathematics; (4) science, physical or biological.

REQUIREMENTS FOR GRADUATION.

The requirements for graduation of the same colleges and universities which were selected as representative with reference to requirements for admission are given as a basis from which to deduce prevalent standards.²

In general, a "semester hour," as used in the following requirements, means one recitation, lecture, or laboratory period per week for one semester, or half year; 120 semester hours means 15 hours of recitations per week per year for 4 years.

Albion College, Albion, Mich.: A. B. for 120 semester hours, plus 240 points in accordance with the point system, E, excellent, 4; G, good, 3; F, fair, 2; P, passed, 0.

¹ Prof. J. R. Angell, in *Science*, XXXIII, 946 ff. (June 23, 1911).

² Unless otherwise stated, the catalogues of 1911-12 are used.

Elective system: Freshman and sophomore work in part required; in part elective on a restricted plan.

Beloit College, Beloit, Wis.: A. B. in either of 2 groups: Language, literature, and arts; philosophy, social sciences, and history; B. S. for group in mathematics, physiology, and natural sciences. Four years' course of 120 to 128 semester hours, with not less than 36 credits. Graduation in 3 or 3½ years possible.

Work is largely elective on the major and minor plan. Time is measured in semester hours. Credits are a measure of the quality of work done. Number of credits necessary to pass from one class to next higher: 8 in freshman, 10 in sophomore, 10 in junior, 10 in senior; 14 semester hours required in freshman year.

Bowdoin College, Brunswick, Me.: A. B., with or without Greek; B. S., required major in either biology, chemistry, or physics. Major (6 courses), minor (4 courses). In freshman year English, French, or German, hygiene, required of all; in sophomore, German; physical training required of all for 4 years.

Work mainly elective. All must take 4 full courses each semester, besides work in hygiene and physical training.

Carleton College, Northfield, Minn.: A. B. and B. S., 130 semester hours required, including 6 for physical education; 130 grade credits required. Group system: A. B. in (1) literature and language or (2) philosophy and history; B. S. in (3) science and mathematics.

In 1st year, work required with certain options; in 2d year about one-half required; 3d and 4th elective. Major of 20 hours in one subject above freshman year, minor of 12 hours in one or two subjects.

Colgate University, Hamilton, N. Y.: A. B. and B. S., 60 semester hours in addition to freshman and sophomore work. Groups: (1) Language, literature, and art; (2) mental and social science; (3) mathematics and natural science.

In 1st year chiefly prescribed; after that mainly elective, except 5 semester hours in psychology. Candidates must choose major of not less than 30 semester hours in a single subject or department, 20 semester hours in selected minor, 20 semester hours in unrelated minor.

Cornell College, Iowa: A. B., B. S., and B. S. in engineering; 124 semester hours, of which 4 are in physical training. Three courses: Arts, science, engineering, each leading to its appropriate degree; 16 hours per week in 1st and 2d years; 15 in 3d and 4th.

Electives, 1st year: Arts, 4 hours; science, 6-2; engineering, 5; for the upper 3 years electives are 40, 36-40, and 36, respectively.

Grinnell College, Grinnell, Iowa: A. B. and B. S.; 15 to 16 hours per week; 120 semester hours. Not the aim of "the group system to secure early specialization."

Branches required of all cover about 40 semester hours; then a major of at least 20 semester hours; a minor of at least 16 semester hours and about 44 semester hours elective.

Lafayette College, Easton, Pa.: A. B., B. Ph., and B. S.; 16 hours per week required, or 128 semester hours. 1st and 2d years prescribed; 3d and 4th half prescribed and half elective. Technical courses prescribed throughout.

Pomona College, Claremont, Cal.: A. B., B. S.; 124 semester hours; 16 to 18 hours in 1st year, 16 in 2d, and 15 in 3d and 4th; 24 "credits" required for promotion to sophomore; 54 to junior; 87 to senior; 120 for graduation; 240 cum laude; 292 magna cum laude; 316 summa cum laude.

In freshman and sophomore years, requirements in English, French, or German, history, mathematics, physical culture. In other years elective within groups.

Rutgers College, New Brunswick, N. J.: A. B., Litt. B., and B. Sc.; 4 years. Studies of freshman year, most of sophomore, and certain subjects of junior and senior years "prescribed for all candidates."

Tulane University, New Orleans, La.: A. B. and B. S. Three courses, classical, literary, and scientific; 126 semester hours, 17 in freshman, 17 in sophomore, and 15 in each of other two, B. S. freshman 20, sophomore 21. Professional work in law may be completed with academic degree in 6 years; in medicine in 7.

Freshman and sophomore years nearly all prescribed for all courses; junior and senior, elective. Junior and senior, 30 hours wholly elective in classical course, 21 hours elective, plus 9 in one group in literary, 30 hours except continuation of one science to a total of 3 years and a second science to a total of 2 years in scientific.

Vanderbilt University, Nashville, Tenn.: A. B., B. S.; about 120 semester hours.

Elective: In sophomore year, 3 hours; in junior, 9 hours; and all of senior; not more than 4 courses in one subject may be offered; graduate work may be taken; also in biblical, law, engineering, and medical departments.

Wabash College, Crawfordsville, Ind.: A. B.; 188 hours of college work (equal to about 126 semester hours), in addition to physical culture. College year divided into 3 terms; and 4 weekly recitations through 3 terms give a credit of 12 hours (8 semester hours); 104 hours prescribed in English, foreign language, history, or economics, mathematics, science, physiology, physical culture.

Elective work: Eighty-four hours, including professional studies. An option is offered of 3 years of prescribed work as above, with the 4th year spent at an approved professional or technical school.

Williams College, Williamstown, Mass.: Semester hours, 124 "and a grade above D in at least one-half the number of hours required for graduation." Freshman year subjects prescribed according to the admission group in which the student entered. Eleven major groups, each consisting of sophomore introductory course, three prescribed courses in junior and two advanced year courses in senior year, arranged in three divisions: (1) Language, (2) philosophy (including art, economics, government, and history), and (3) science (including mathematics).

After freshman year all courses are elective. Major of at least 15 semester hours.

In 1911 the college announced an elaborate application of the principle of prerequisites for admission to other courses.

University of California, Berkeley, Cal.: Course divided at end of sophomore year into lower and upper division and is marked by junior certificate. Work for which is largely prescribed. For work in upper division: Reading knowledge of French and geography; 36 units of work in major courses, 15 of which must be in one department. For junior certificate there is required 64 units of university work (same as semester hours), in addition to certain work in English, and 45 units required for admission, making 109 units. The 64 units may be done in 2 years.

In upper division, requirements are normally 60 units in letters, social science, natural science, and commerce colleges (may be reduced to 51), and 93 to 96 in colleges of chemistry and engineering. Extra credits for junior certificate may effect reduction. Two years' residence.

Total units required for degree, exclusive of matriculation: In college of letters, social science, natural science, agriculture, 124 units; in commerce, 129; architecture, 125; 5 years' course in mechanics, mining and civil engineering, chemistry, 166; for 4 years' course in same, 150.

Catholic University of America, Washington, D. C.: A. B., B. S., L. H. B. (bachelor of letters), and Ph. B.; 4 years, 32 weeks each, or 120 semester hours.

For bachelor's degree: 1st year, prescribed or 3 electives; 2d year, 3 or 4 or 6 electives; 3d year, 6; 4th year, 6 or 11. In school of sciences required studies are in religion and philosophy and at least 11 of 21 credits each year must be in school of sciences.

For Ph. B. electives are same in number, except in 4th year, 6 instead of 11.

University of Chicago, Chicago, Ill.: A. B., Ph. B. (Lit.), and S. B. conferred when student has completed 36 majors and received 72 grade points. Title of Asso-

ciate when he has completed 18 majors with 32 grade points. Principal sequence of 9 majors required and secondary sequence of 6 majors. Departments 1-6 are philosophy, history, and social science; departments 13-14 are modern languages; department 17 is mathematics; departments 18-28 are science. A. B. conferred for work in Latin and Greek; Ph. B. for work in departments 1-16; S. B. in departments 17-28. Department 17 (mathematics) will earn either Ph. B. or S. B. May elect from professional courses.

Columbia University, New York, N. Y.: A. B., B. S.; 124 "points" or semester hours. Course for each half year must not exceed 19 nor fall under 12 points. "To be recommended for a degree a student must make at least 84 points in actual college residence, and of these at least 24 in Columbia College."

Work is prescribed during first two years "when practicable." Student must have completed "the equivalent of 3 years of sequential study, in courses aggregating at least 18 points," for A. B., in part in languages, history, and philosophy; for B. S., in part in science; may elect graduation courses.

Cornell University, Ithaca, N. Y.: A. B., 120 semester hours, with extra work in physical culture, military science, and tactics; may get entrance credits; may do one of the eight terms in summer session of Cornell or elsewhere; must be in residence at least two terms.

In 1st and 2d years must take at least 60 hours, including 24 hours in English and history, foreign language, philosophy, mathematics, physics, chemistry, geology, physical geography, and biological science.

Electives in 3d and 4th years within 12 groups, in one of which he must do at least 20 hours' work; vocational courses also elective.

Harvard University, Cambridge, Mass.: B. A. and B. S.; must pass in 16 courses "together with such work in English as may be prescribed for him," making 17 or 17½ courses; also must attain a grade of D in two-thirds of all work and in senior year pass in not less than 4 courses with grade above D. Certain summer courses may be counted or college studies may be anticipated before entering, but at least one year of residence necessary. The A. A. degree (associate in arts) is conferred upon non-resident students who have passed in extension courses the work necessary for A. B.

Prescribed, 1st year, English, German, or French; elective, 3 or 4 other full courses. For 2d, 3d, 4th years English and reading knowledge of French or German required; elective, 4 full courses and may take up to a total of 6 prescribed and elective courses the year.

Must take at least 6 courses in some one department or in one recognized field and "shall distribute at least 6 of his courses among the 3 general groups in which his chief work does not lie."

University of Illinois, Urbana-Champaign, Ill.: A. B. and B. S. in engineering and agriculture; either first 3 or last year in residence; 130 semester hours. Second bachelor's degree may be had for 30 semester hours extra. Limited amount of work toward A. B. given for courses in other colleges and schools of the university.

Prescribed: Rhetoric, physical training, military science. A minimum of 8 hours in each of the following groups: English, foreign languages, social science, mathematics and philosophy, natural science.

Must offer not less than 24 hours for major subjects, but not more than 40 hours in one subject may be counted. Enough credits from elective list to give the required 130 semester hours.

Indiana University, Bloomington, Ind.: A. B. 4-year course of 183 hours (equal to 120 semester hours). Must have at least one year of daily work in the major subject; 15 hours credit may be obtained in the correspondence courses.

Prescribed: 6 hours English, 3 hygiene, 30 language, 15 mathematics or physics, 15 in some other science; 20 from history and political science, economics and social

science, English literature, Greek literature in English translation, philosophy, education, fine arts, history of English language.

All A. B. graduates must select a major subject of from 45 to 60 hours. Major and collateral work must count up to 75 hours. For freshman: Required, 1 hour hygiene and physical training, 2 hours English; elective, 13 hours within certain rules.

State University of Iowa, Iowa City, Iowa: B. A., B. S.; 120 semester hours without credits for hygiene, military drill and hygiene; 125 semester hours with credits for these; 7 years required for combined course in medicine or homeopathic medicine and liberal arts; 6 years for B. S. in medicine or homeopathic medicine or dentistry and liberal arts; law may be taken as part of liberal arts course.

Required: 1st year, 7 to 9 hours; 2d, 4 hours. Elective: 1st year, 8 to 10 hours; 2d, 11 to 13 hours; 3d and 4th, 14 to 16 hours. Requirements both years are in English and foreign languages, military drill or physical training and hygiene.

Major study of 24 semester hours required, no part of which is to be taken in 1st year and 12 semester hours in each of two groups in which major does not fall.

Johns Hopkins University, Baltimore, Md.: A. B. for all courses and the degree signifies "in the case of every recipient such instruction in ancient and modern languages, in mathematics, in the physical and natural sciences, in literature, philosophy, and history, as is believed to be essential to a liberal education." Twenty courses of 3 hours per week each. The equivalent of 120 semester hours. Last year at least must be in residence.

Courses 1st and 2d years prescribed; in 3d and 4th years only one or two studies prescribed; no Latin or Greek required. Standard course, 3 hours per week through the year.

Twenty courses required for graduation and no combination accepted which does not include three courses in one subject and two in another. Nineteen courses accepted of student whose average is not less than 9 for work of his 3d year and with no work below 7.

Twelve courses required of all candidates; eight elective in accord with the group system. Groups: Ancient languages; modern languages, including English; history and political science; mathematics and physics; chemistry, biology, and geology.

Kansas University, Lawrence, Kans.: A. B., 120 semester hours. May elect half of senior work in law or all in medicine. Work divided into 9 groups. Freshmen and sophomores must complete 60 hours, by taking at least 5 hours in each of 6 groups and not more than 20 hours in one department. All freshmen must take 5 hours of rhetoric, hygiene, and work in gymnasium.

Major course must consist of 30 to 60 hours in one group, 20 to 40 of which must be in one department. Not more than 30 hours elective work may be taken in one group.

Leland Stanford University, University, Cal.: A. B., 120 "units" (120 semester hours); degree is conferred when requirements are met, without regard to the time spent, except that at least 30 units (including last 15) must be completed in this university.

English composition prescribed for 1st year undergraduates who do not satisfy matriculation test, otherwise work is entirely elective.

Major subject counting not more than 40 units; as a general principle at least 60 units must be taken outside of major, but in applied science the major department may prescribe so much of the entire 120 as "it shall deem essential."

University of Michigan, Ann Arbor, Mich.: A. B. and B. S., 120 hours credit (120 semester hours), together with 135 grade points; residence of at least one academic year required. Work of one-half semester may be done in summer sessions.

Rhetoric required of all; other work all elective. If 60 hours have been earned in mathematics and the physical and biological sciences, B. S. may be conferred instead of A. B.

University of Minnesota, Minneapolis, Minn.: A. B., 126 credits (i. e., 126 semester hours) in addition to required exercises in drill, gymnasium, and physical training. B. S. at end of 4 years, and M. D. at end of 7; A. B. in 4 and M. D. in 8. A. B. in 4 years and D. D. S. at end of 6 years; 6 years in arts and law gives A. B. and LL. B.

Must secure a grade of "good" on at least 60 credits. Must complete a major (i. e., 18 credits) and 4 minors (i. e., 12 credits) and at least 1 of the 5 subjects must be chosen from each of the following groups: (1) English and foreign languages; (2) biology, astronomy, botany, chemistry, geology, mineralogy, physics; (3) economics and political science, history, mathematics, philosophy, sociology, and anthropology.

1st year, 3 hours rhetoric required. Elective: 1st year, 11-14 hours. All in other years must have major and 4 minors.

University of Missouri, Columbia, Mo.: A. B., 120 semester hours; may offer in part "work done in the summer session" and "work done in any institution of good standing" on certain courses.

In 1st and 2d year 35 hours required in English, history, ancient languages, modern languages, mathematics, logic or psychology, physical science, and biological science, but sufficient entrance units may waive all.

Otherwise elective, but must have one major (24 hours) and one minor (12 hours). May elect courses from colleges of agriculture, medicine, engineering, law, education, and journalism.

University of Nebraska, Lincoln, Nebr.: A. B. and B. S., 125 credit hours (125 semester hours); students in absentia must do one-third more work than when in residence. For B. S. must take major in science department and complete not less than 60 hours in mathematics and natural science.

Required: Rhetoric, 4 hours; military science, 4 hours. Must complete (40 to 48 hours) 6 out of 8 groups and have major of 24 to 40. Not more than 20 per cent of work below grade of 70 per cent is credited on requirements for graduation.

University of Pennsylvania, Philadelphia, Pa.: A. B., B. S., B. S. in Economics, Chemistry, Architecture, Civil engineering, Chemical engineering, Mechanical engineering, Electrical engineering, or Biology. Sixty-four units of work (i. e., 128 semester hours); may be completed in 3, 4, or 5 years, at option of student. May take 8 units in medicine. May combine courses in arts and architecture so as to take A. B. in 4 years and bachelor's degree in architecture at end of 6th year. For A. B., elementary Latin and Greek required for admission.

Required: 26 units in English, foreign languages, history, logic and ethics, mathematics, physics, physical education, chemistry.

Work elective in accord with group system up to 18 units; remaining 20 units are free electives.

Princeton University, Princeton, N. J.: A. B., Greek and Latin freshman and sophomore years required; Litt. B., B. S. Four years with 16 to 17 hours work per year.

Freshman work required, 16 hours; sophomore, in part elective; junior and senior elective but "largely conditioned by his selection of the electives in the sophomore year"; junior must choose a department (1 of the 11 into which work is divided); must take 3 of his 5 courses in this department, 1 outside and 1 is for free election. Senior must continue work of junior year. Emphasizes system of "prerequisites for registration for higher courses" and the "preceptorial system."

University of Virginia, Charlottesville, Va.: B. A. and B. S. given for completion of 13 courses (a course equals 3 hours per week through the year), 60 "session hours," i. e., 120 semester hours. Time required, usually 4 years, of which at least 1 year in residence with at least 3 courses. May elect courses in law, medicine, or engineering. With the vocational degree of B. S. the school in which the principal work has been done is mentioned on the diploma, as B. S. in chemistry.

Six groups: (1) Languages; (2) mathematical science; (3) natural science; (4) social science; (5) English; (6) philosophical science. Latin and Greek required for B. A. Otherwise wide selection; must select a "major or principal school."

University of Wisconsin, Madison, Wis.: A. B., B. S., Ph. B., 128 credits (128 semester hours), including 8 credits for required work in gymnastics and military drill (4 for women, instead of 8). Candidates for A. B. may elect up to 20 credits in college of mechanics and engineering, agriculture, and from school of law, pharmacy, commerce, music, home economics, or State library school. Summer school work earns 6 credits.

Required: English, 6 credits; language, 16 credits; and 2 out of natural science (10 credits), mathematics (6 credits), history (6 credits).

Must select major study, which with thesis counts 20 to 40 credits. All other work elective but not more than 40 credits in all in 1 department.

Yale University, New Haven, Conn.: A. B., 60 year hours, equivalent of 120 semester hours. Extra hours in addition to the 120 semester hours may be necessary by absence. Work may be completed in 3 years.

Main divisions: (1) Language, literature, and arts; (2) mathematics and the physical and natural sciences; (3) philosophy, education, history, and social science, making in all 25 groups.

Major (12 hours) and minors (5 hours or more); every candidate must complete before graduation a major and a minor in some one of the 3 main divisions and a minor in each of the other 2 main divisions. All freshmen required to take 5 of certain 3-hour listed courses; 3 must be in continuation of subjects offered for admission.

DEPARTMENTS OR SCHOOLS OF EDUCATION IN LIBERAL ARTS COLLEGES.

Many of the universities and colleges carry in the bosom of the college of liberal arts a department or an organized school of education. As standards for these schools, as well as for a developed teachers' college, the following represents the general usage:¹

Already the departments of education in most of the institutions in the Middle West require the completion of a prescribed course, which includes work in the history and the philosophy of education, in educational and genetic psychology, secondary-school management and teaching, and in observation and practice.

As Dean Russell has stated:

The lowest requirements which can consistently make for such a diploma or certificate are as follows:

(a) The candidate must be a college graduate, at least when he receives the diploma if not when entering upon the course, or have the equivalent of a college education.

(b) He must satisfactorily complete courses (1) in the history of education; (2) in the philosophy of education; (3) in school economy, especially school hygiene—an allotment, say, of 8 hours a week throughout 1 year.

(c) As evidence of special knowledge in each subject in which a diploma is sought, the candidate should be able to show the equivalent of at least 3 years' collegiate study of the subject * * *. Such a course may very properly be conducted wholly or in part by the university department, which is responsible for the academic training in subject matter.

(d) The candidate must be given opportunity to observe good teaching, study in its method under guidance, and finally give instruction under normal conditions long enough to demonstrate his ability to teach.

The lesson from German experience is that to liberal culture you must add special scholarship, and to special scholarship professional knowledge, and to professional knowledge teaching skill.

For a vindication of combined courses, with the arguments pro and con, see "Combined Courses in Academic and Professional Work.

¹ Nat. Educ. Assoc. Rep. of Com. of 17 on Prof. of High Sch. Teachers, July, 1907, pp. 580-81.

Report from a committee of Indiana University appointed under instructions from the Association of American Universities,"¹ presented at the annual meeting of the association, 1910.

THE QUALITATIVE ELEMENT IN STANDARDS, DISTINCTIONS, AND GRADES.

Gradually we are approximating a more exact system of standardizing by an induction from data gathered representing facts and by a recognition of the importance of ratios instead of using, as was at first necessary, gross objective standards. This tendency is well illustrated in the following resolutions by a committee, Prof. E. L. Thorndike, chairman, appointed to collect facts in section L—education—of the American Association for the Advancement of Science.²

Resolved, That samples of the facts concerning the number of students taught by one instructor be sent to the colleges and universities on the list of the United States Bureau of Education.

Resolved, That those in charge of collegiate instruction in each of these institutions be requested to report in print or to this committee any facts concerning the relation of the size of class to efficiency in teaching, with special reference to the following questions:

1. Is not the number of students taught at one time by a single individual in many college courses so great as to reduce that individual's knowledge of the attitude, preparation, difficulties, errors, and achievements of his students to almost zero?
2. Is not the number of students taught at one time by a single individual in many college courses so small as to involve an enormous waste of the instructor's time and an improper distribution of the appropriations for teaching?
3. Other things being equal, should not the teaching of more than 40 college students at one time by one person be avoided? Should not any department have reasons of weight for any such case?
4. Other things being equal, should not the use of a quarter or more of a professor's teaching hours for a year for the instruction of fewer than 10 students in one undergraduate course, counting one-twentieth or less of the degree's total requirement, be avoided? Should not any department have reasons of weight for any such case?
5. Should not the traditional method of having the ratio which the number of class meetings is to the number of "points" credit the same, regardless of whether the class enrollment is 1, 5, 10, 20, or 100, be abandoned in many of the undergraduate courses enrolling less than 10 students?
6. When in a college course given annually the number of students is less than 6, should not the course be offered only once in 2 years, except for reasons of weight?

Resolved, That those in charge of collegiate education in the colleges and universities on the list of the United States Bureau of Education be requested to consider the advisability of reporting for 1910, and once in every 10 years thereafter, a detailed statement of the work done for the bachelor's degree by each member of the graduating class or by each of 100 students chosen at random from it?

¹ See also Science, Oct. 22, 1909, pp. 533-48, Dean Christian's objections, and a reply by Prof. Dodson, Science, Nov. 19, 1909, pp. 709-11; also Science, Nov. 12, 1909, p. 679, quotation from Harvard bulletin; also Proc. of 10th annual meeting of Assoc. Amer. Univ., pp. 41-49, arguments of President Eliot against combined courses, and for them President Schurman, Dean Vaughan, and President Northrop.

² Science, Apr. 15, 1910, p. 595.

Consciously or unconsciously impressed by the dangers of a quantitative and mechanical requirement for graduation and even for admission, many of the colleges are attempting to care for the qualitative requirements. Some evaluate courses of study by giving them grades, as they are more or less elementary in character or done by more advanced classes of students. Some form of marking system is tried, eliminating, stimulating, or giving rank, and provisions of extra work to students—provisions with notable exceptions in an institution like Leland Stanford. Provisions for extra work, by which the time for graduation may be shortened, have become general.

Honors or distinctions recognize quality as well as quantity of work. In form the final honors generally are traditional under the terms of the older American college commencement parts, of oration, dissertation, and disquisition, which evidently reflect the German university distinctions of *summa cum laude*, *magna cum laude*, and *cum laude*. There is an evident reaction against the doctrinaires who would abolish all grades and distinctions. In addition to meeting the qualitative demands of scholarship, the influx of students and the opportunities of the elective system for “snaps” have brought a negative as well as a positive application of the marking system by which inferior students are eliminated from the college.

The present practices, so far as the catalogues give information, are well shown by the regulations of the following institutions:

DISTINCTIONS AND MARKING SYSTEMS IN TYPICAL COLLEGES AND UNIVERSITIES.

Beloit: A degree cum laude, granted for 62 credits; magna cum laude for 96 credits; summa cum laude for 110 credits. These credits are earned in courses requiring 120 to 128 semester hours.

Bowdoin: Records marked on a scale of 10, but preserved in letters—A (9-10); B (8-9); C (7-8); D (6-7); E is below 6 and indicates a condition.

Carleton: A (excellent); B (good); C (fair); D (poor); E (failure); I (incomplete); X (conditioned). Candidates for honors must not fall below C in any subject during their entire course; in the department in which honor is given a grade of A must be maintained throughout the major work. A degree cum laude granted for 55 grade credits; magna cum laude for 75 grade credits; summa cum laude for 85 grade credits.

Cornell College: Has system of demerits under which suspension is the penalty for four demerits.

Grinnell College: A (excellent); B (good); C (fair); D (poor); E (failure). For graduation must obtain C or over in one-half total number hours.

Lafayette College: At commencement “the faculty awards such honors as it sees fit to those who are to receive degrees.” These honors, ordinarily, are “a valedictory oration, a Latin salutatory, and other honorary orations and theses.”

Rutgers: Grading on scale of 100; a combination of three-fourths of class work with one-fourth of examination work gives the term grade. A (90-100); B (80-89); C (70-79); D (60-69); E, F, G, H denote various conditions between failure to pass and failure.

Highest honors to students attaining an average grade of A and no single grade lower than B. High honor indicates average of B and no grade lower than C. Honors, average B. Special honors, in electives; and to students in the B. S. courses. Six commencement speakers chosen by grade in speaking and composition.

Tulane University: Grades—A (95-100); B (90-94); C (80-89); D (70-78); E (deficient).

Williams College: "Class honors" awarded each year to students in each class who have attained grade A in courses amounting to 24 semester hours in that year and have not fallen below B in any. "Highest class honors" go to those who have attained A in all studies, provided they amount to 30 semester hours.

"General final honors" to those who have attained A in at least half their studies and fallen below B in none.

"Highest general final honors" to those who have attained A in all courses.

"Final honors" awarded to student who has attained A in all subjects making up his major.

All students must attain a grade above D in at least one-half the hours required.

University of California: Entrance and undergraduate examinations graded into five divisions—1st grade (marked excellence); 2d (thoroughly satisfactory); 3d (passed); 4th (reexamination required); 5th (failed). Grading is based on term work and examinations.

Graduate students may be graded as above or merely marked as "passed" or "not passed" at option of instructor.

Columbia: Entrance examinations are marked—P (passed); D (conditioned); F (failed). Undergraduate work is marked—A (excellent); B (good); C (fair); D (poor); F (failure). A, B, C, D, passed.

Students divided into "candidates for a degree with honors" and "candidates for a degree." Passing the examinations with A in all three subjects entitles to degree "with highest honors;" 2 A's and a B entitle to degree "with high honors;" A and 2 B's, "with honors."

Cornell: The passing mark is 60 or over; 41-59 is a condition; below 41 is a failure.

Harvard: In 1886 a new grading system was adopted: "In each of their courses students are now divided into five groups, A, B, C, D, E. E is composed of those not passed. To graduate, a student must have passed in all his courses and have stood above D in at least one-fourth of his college work; and for the various grades of the degree, honors, honorable mention, etc., similar regulations are made in terms of A, B, C, etc., instead of in percentage as formerly. * * *

Grades are considered in promoting from one class to another, and to be promoted the candidate must make a grade higher than D in a major part of his studies. "Honors" and "highest honors" are offered as second-year honors in the classics. The degree "with distinction" is offered in three grades: Cum laude—distinction; magna cum laude—high distinction; summa cum laude—highest distinction. A Commencement Part is assigned to every student recommended for a degree with distinction, an Oration to a candidate for a degree summa cum laude, a Dissertation to a candidate for a degree magna cum laude, and a Disquisition to a candidate for a degree cum laude. The words Oration, Dissertation, and Disquisition indicate merely the grade of distinction in the degree, and do not imply differences in the nature of the Commencement Parts.

Illinois: Preliminary honors are awarded for scholarship in first two years to not exceeding one-tenth membership of sophomore class.

Final honors are assigned on graduation for scholarship in last two years to not more than one-tenth senior class.

Special honors are assigned on graduation to "especially brilliant students" for advanced work of not less than 20 hours done before senior year and 30 hours done in that year, together with a thesis.

Indiana: Grades—A (95-100); B (85-94); C (75-84); D (65-74); conditioned; failed.

Final honors for excellence in scholarship are granted to a limited number of graduates (not exceeding one-tenth); honors are: "With distinction," "With high distinction;" not granted for less than three years' work in residence.

State University of Iowa: Grades—A (high distinction); B (superior work); C (average work); D (work below average but above passing grade); E (a low passing mark); Cond. (conditioned); Fd. (failed). Student must balance hours graded E with an equal number marked B or A.

Johns Hopkins: A student whose average in his studies for each of his last two years has not been less than 9, and who has not received a mark less than 7.5 for any of his courses during his last three years shall receive the degree *with honor*.

Special students who have been in residence at least two years and who have completed their work in a satisfactory manner may receive certificates stating the facts and signed by the president of the university.

Minnesota: Grades—Excellent, good, passed, conditioned, failed. For graduation an average of "good" must be secured in at least 50 per cent of the courses; for purpose of computing this an "excellent" is held to balance a "passed," making an average of "good." Student deficient in more than one-half of his work loses class rank, and if conditioned or if he fails in 60 per cent is dropped.

The "degree with distinction" is granted for special excellence in the major subject in one department only.

Missouri: Grades—M, S, E, I, F. The grade of M means that the student ranks among the medium students, approximately 50 per cent. Above this grade are the following two: The grade of S means that the student ranks among those who are superior to the medium students. The grade of E means that the student is one of the few most excellent students. Below the grade of M are the following two: The grade of I means that the student ranks among those who are inferior to the medium students. The grade of F means that the student belongs among those ranking lowest. To secure S means that the student must show himself superior to 75 per cent of the students in that branch in the last few years.

To encourage the best possible work, the faculties of the college of arts and science and of the school of education credit work in proportion to the grade received, thus enabling the ablest and most industrious students to graduate in three years. For each recitation hour for which the grade of Excellent is recorded the student will receive 30 per cent additional credit toward the total number required for graduation. For each recitation hour for which the grade of Superior is recorded he will receive 15 per cent additional credit toward graduation. The faculty further recognizes that those students who are inferior to 75 in 100, but whose work is not estimated by the teacher as a complete failure, are entitled to some credit. Students will, therefore, be given four-fifths of the normal credit toward graduation for each recitation hour for which the grade of Inferior has been recorded.

Nebraska: Grades above passing (70) are reported to the registrar in figures, either in straight percentages or in multiples of 5. Below passing the following are the markings: F (failure below 60); C (conditioned); I (incomplete); also A (withdrew in good standing); D (delinquent at time of withdrawal); W (withdrew without permission). Delinquents and absentees are reported each week. At middle of semester all students below passing grade are reported.

Pennsylvania: Grades—d (distinguished); g (good); p (passed); n (not passed, student is entitled to a reexamination); f (failure, subject must be repeated in class). Awards senior and sophomore honors.

Princeton: Grades are based on term examinations and classroom work and divide students into 5 groups: (1) Very high standing, not over 10 per cent; (2) high standing, 20 per cent; (3) medium standing, 35 per cent; (4) low standing, 25 per cent; (5) very low standing, 10 per cent.

The first and second general groups thus determined are the honor groups of the graduating class, and are designated *magna cum laude* and *cum laude*, respectively. The higher distinction of *insigni cum laude* and highest of *summa cum laude*, are reserved for very unusual excellence. Special honors in particular departments are also awarded.

Virginia: The grades for passing in any course are as follows: In the college, the department of graduate studies, the department of engineering, and the department of agriculture, 75 per cent; in the department of medicine, 80 per cent; in the department of law, 83 per cent. Students who make less than 40 per cent are dropped; those making 40-65 per cent are put on probation and unless the grade is improved the next session are dropped.

Wisconsin: Honors are given at graduation for special work of high order of excellence done in any department. Such honors will be voted by the faculty to those students whose graduation theses show exceptional excellence, and who have completed with unusual success a long course of study in the department in which the thesis is presented.

Yale: The passing mark is 2 on a scale of 0-4. Standing as indicated by letters is: A (3.30 or above); B (3-3.29); C (2.60-2.99); D (2.25-2.59).

Warnings are sent out in November and March to all students who are below 2.25 in their general standing or in any subject, and a student who has received such warning for his general standing or in 8 hours of classroom work is under the restriction of *disqualification*. A student whose average scholarship standing, or whose standing in courses aggregating 8 hours, for one-third of a year falls below 2 may be put on *probation*, or rated with a lower class, or both, or if a freshman or already rated with a lower class, may be permanently separated from his class. Other penalties for poor scholarship are *exclusion from a course* and *removal from college*.

Junior and senior appointment lists, based on the work of the first half and the whole of the college course, respectively, and honor lists for the work of freshman and junior year are issued, and honors in special studies are conferred each year.

DEFINITIONS OF A STANDARD COLLEGE.

In addition to the commonly used definition of a college set out by the New York State statute and the Carnegie Foundation (see p. 27) the following definitions, which for the most part have been elaborated from it, indicate an approximation to one standard.¹

The nucleus of the definition of a college appeared in the constitution of the North Central Association of Colleges and Secondary Schools (adopted March, 1895):

Sec. 5. No college or university shall be eligible to membership whose requirements for admission represent less than 15 units of secondary work as defined by the Commission on Accredited Schools.

Sec. 6. No college or university shall be eligible to membership which confers the degree of doctor of philosophy or doctor of science, except after a period of 3 years of graduate study, not less than 2 of which shall be years of resident study, 1 of which shall be at the institution conferring the degree.

Sec. 7. No secondary school shall be eligible to membership which does not provide 15 units of secondary work as defined by the Commission on Accredited Schools.

The subject of a standard college was discussed in extenso by the North Central Association in connection with the report of the committee on accrediting colleges in 1908.²

¹ North Cen. Assoc., 1907, pp. 30-37.

² Proc., 1908, pp. 86-114.

Finally, in 1909, the association adopted the following college standards for admission to the association:¹

The standard American college is a college with a four years' curriculum with a tendency to differentiate its parts in such a way that the first two years are a continuation of, and a supplement to, the work of secondary instruction as given in the high school, while the last two years are shaped more and more distinctly in the direction of special, professional, or university instruction. For students who are not to enter professional or graduate schools, and for those who are willing to lay a broader foundation for their professions than is laid by those who specialize at the end of the sophomore year in the university, the four years' college work may be treated as a unit. For those who have chosen their professions, the last two years in the best independent colleges should provide ample opportunities for training preliminary to the professions. The independent college may thus become a cooperative university college.

2. The minimum scholastic requirement of all instructors shall be equivalent to graduation from a college belonging to this association, and graduate work equal at least to that required for a master's degree. Graduate study and training in research equivalent to that required for the Ph. D. degree is usually necessary, but an instructor's success is to be determined by the efficiency of his teaching and not by his research work.

3. The college shall require for admission not less than 14 secondary units as defined by this association.

4. The college shall require not less than 12 college units, or 120 semester hours, for graduation.

5. The character of the curriculum, the efficiency of the instruction, the scientific spirit, the standard for regular degrees, the conservatism in granting honorary degrees, the tone of the institution shall be chief factors in determining eligibility.

6. The college should be provided with adequate books in the library and laboratory equipment to develop fully and illustrate each course taught.

7. The number of hours of work given by each instructor will vary in the different departments. To determine this, the amount of preparation required for the class and the time needed for study to keep abreast of the subject, together with the number of students, must be taken into account.

8. The college must be able to prepare its graduates to enter without conditions as candidates for advanced degrees reputable graduate colleges.

9. No institution shall be considered for membership or retain membership unless a regular blank has been filed with the commission and is filed triennially unless the inspectors have waived the presentation of the triennial blank.

10. The local inspector shall be the organ of communication between the college and the commission.

In 1907 the Association of Colleges and Preparatory Schools of the Southern States considered the following college standards in the form of proposed by-laws for the association:

1. No college belonging to this association shall maintain a preparatory school as part of its college organization. In case such school is maintained under the college charter, it must be kept rigidly distinct in students, faculty, and discipline.

2. Every college belonging to the association shall seek to promote the development of high schools in every way, and to this end shall admit no students except those who have completed a reputable high-school course. In measuring the amount of work done by such students, the association accepts the valuation indicated in the first annual report of the Carnegie Foundation for the Advancement of Teaching, published in 1906.

¹ Proc., 1909, pp. 52-53.

3. Candidates seeking full admission to college for any degree course in the literary department must offer 14 units of work. Irregular students may be admitted to partial standing by offering 10 units of work. Students may be admitted either on certificate or on written examination, but they must in all cases comply with the above requirements as to the amount of work offered. Conditions may not be so construed as to excuse students from offering at least 10 units of preparatory work. The association strongly recommends that all candidates be required to offer English and mathematics, and that all candidates for full admission or for any degree courses be required to offer the necessary preparation in two languages besides English. Irregular students may become regular; that is, may secure full admission to college in two ways: (a) By passing off the necessary number of units in subjects prescribed for admission as the result of private study or in class; (b) by doing other work offered in college which shall be counted as the fulfillment of entrance requirements. In such cases two hours of class work for one college year shall be counted as equivalent to one entrance unit; but college work thus offered for admission must not be counted toward a degree.

4. Special students may be admitted to college without the usual form of examination under the following conditions: (a) They must be of mature age (not less than 20 years is suggested); (b) they must not be admitted to classes for which entrance examinations are required unless they pass such examinations; (c) they must give proof of adequate preparation for the course sought; (d) their names must be separately printed in the catalogue.

5. No preparatory school that confers degrees shall be eligible to membership in this association. Any school seeking membership must have a curriculum of study amply sufficient to meet the fullest requirements of the association for admission to college and must have students regularly finishing such course of study each year.¹

The Carnegie Foundation report for 1908 gives a table of 56 institutions, distributed through the whole country, showing the advance in requirements for admission in units in 1907-8, and naming 13 colleges that had raised their requirement by making the course in their preparatory departments one of 4 years instead of one of 3 years. The results of correspondence with more than 500 colleges indicated a duplication of this record of advance for the year 1908-9 (pp. 92-93).²

In 1906 an attempt to define a college appears in the report of a committee on standards for admission to membership in the College Entrance Examination Board. Dean Hurlbut, of Harvard, chairman, presented the following:

In the college applying for admission—

1. There shall be specifically defined and consistently carried out, whether by examination or certificate (or for the admission of special students), requirements for admission which shall in every case be equivalent to a four years' course in a college-preparatory or high school of good grade, able to prepare its pupils for admission to the colleges already belonging to this board.

2. The members of the faculty shall have an academic training adequate to maintain a high standard of teaching; they shall bear a proper proportion to the students to be taught, and shall be sufficient in number to permit of proper specialization in the subjects assigned to each individual instructor.

3. The breadth of the college curriculum, the standard of graduation, the grade of work, and the amount of work demanded shall be proper subjects of inquiry by the executive committee and shall constitute factors in determining their decision.

¹ Carnegie Foundation for Advancement of Teaching, 3d An. Rep. of Pres. and Treas., 1908, pp. 96-97.

² See also U. S. Bu. of Educ. Bull., 1910, No. 6, whole number 445—Statistics of State Universities and Other Institutions of Higher Education partially supported by the State.

4. There shall be no preparatory department under the government or instruction of the college faculty.

5. There shall have been, for at least 3 years preceding the application for admission, an average of at least 50 students in the regular entering classes (courses in arts and in science to be reckoned together for this purpose.)

6. There shall be an annual free income-bearing endowment, yielding in no case less than \$20,000 annually; in case of State universities or State colleges an equal appropriation, expended exclusively on the undergraduate department, as well as libraries, laboratories, buildings, and equipment adequate to maintain the degree of efficiency and the standard of scholarship contemplated in the above provisions.¹

In 1903 the North Central Association of Colleges and Secondary Schools appointed a committee to take into consideration the advisability of extending the work of the commission so as to include accredited colleges and to determine what should be the requirements for the bachelor's degree. In 1906 the association enlarged the name and scope of the Commission on Accredited Schools by adding "and Colleges."²

The Pennsylvania School Laws and Decisions (1909) define colleges and academies as follows:

CCCLXXX. That all institutions of learning hereafter to be incorporated as colleges, universities, or theological seminaries, with power to confer degrees in art, pure and applied science, philosophy, literature, law, medicine, and theology, or any of them, shall be incorporated in the manner hereinafter set forth, with general power as follows:

First. To have succession by their corporate names for the period limited by their charters, and when no period is limited thereby or by this act, perpetually, subject to the power of the general assembly, under the constitution of this Commonwealth.

Second. To maintain and defend judicial proceedings.

Third. To make and use a common seal and alter the same at pleasure.

Fourth. To hold, purchase, and transfer such real and personal property as the purposes of the corporation require, not exceeding the amount limited by its charter or by law.

Fifth. To appoint and remove such subordinate officers and agents as the business of the corporation requires, and to allow them suitable compensation.

Sixth. To make by-laws, not inconsistent with law, for the management of their property and the regulation of its affairs.

Seventh. To enter into any obligation necessary to the transaction of their ordinary affairs.

CCCLXXXII. No institution shall be chartered with the power to confer degrees unless it has assets amounting to five hundred thousand dollars invested in buildings, apparatus, and endowments for the exclusive purpose of promoting instruction, and unless the faculty consists of at least six regular professors who devote all their time to the instruction of its college or university classes, nor shall any baccalaureate degree in art, science, philosophy, or literature be conferred upon any student who has not completed a college or university course covering four years. The standard of admission to these four years' courses or to advanced classes in these courses shall be subject to the approval of the said council.

¹ See Col. Entrance Ex. Bd., Doc. 48, Dec., 1910; Proc. of 12th an. meeting N. Cen. Assoc. of Col. and Sec. Schs., pp. 22, 23.

² Proc. N. Cen. Assoc., 1906, p. 130. Cf. Director Carman's paper, "Shall we accredit colleges?" in Proc. N. Cen. Assoc., 1907, pp. 81-96, and the presidential address, "An American Federation of Learning," by George E. MacLean, pp. 3-25.

The Ohio school laws in force April 16, 1906, define a college as follows:

(SEC. 4007-3) A college is hereby defined as a school of a higher grade than a high school, in which instruction in the high-school branches is carried beyond the scope of the high school and other advanced studies are pursued, or a school in which special, technical, or professional studies are pursued, and which may, when legally organized, have the right to confer degrees in agreement with the terms of the law regulating its practices or its charter; or, in the want of legislative direction, in agreement with the practices of the better institutions of learning of their respective kinds in the United States.

In 1907 the General Assembly of Iowa (secs. 2634-f to 2634-h, school laws, 1907) passed a statute exempting from examinations for a State teacher's certificate the graduates of the college of liberal arts of the State University and of the general course of the college of agriculture and the advanced course of the normal school, and colleges having rank and collegiate courses of instruction equivalent to those in the State institutions. This legislation made the courses named collegiate and normal school standards for the State, and made it necessary for the State board of educational examiners to set out a definition and standards for accredited colleges.

They adopted the following specifications, set out 8 objective standards, and made temporary provision for classifying the colleges in 3 groups. After one year's experience, the board found it necessary to supplement the paper reports of the colleges by an inspection. One of the 8 points was "the average salary of heads of departments, exclusive of the president, shall be at least \$1,000." Objections were made by some of the institutions, which found it difficult to meet the minimum wage scale, to the grouping of the colleges, which originally the board undertook as a temporary expedient to get the law into operation as a stimulus to all deserving colleges. The present regulations of the board, representing the result of experience and suggestions from the colleges, as amended May 8, 1911, are as follows (standards advised by January 1, 1916):

1. The number of class hours for the heads of departments shall not exceed 16 a week.
2. A faculty properly qualified shall consist of graduates of colleges who have pursued graduate work in residence equivalent to that required for a doctor's degree, provided that this requirement shall not apply to faculty members approved by the State educational board of examiners prior to July 1, 1910.
3. The library shall consist of at least 15,000 volumes, selected with reference to college subjects and exclusive of public documents.
4. The laboratory equipment shall be worth not less than \$15,000, and so distributed as to establish at least an efficient chemical, physical, botanical, and zoological laboratory.
5. The means of support is defined as requiring a permanent productive endowment of not less than \$500,000, or a fixed assured income, exclusive of tuition, of at least \$25,000.
6. The college must maintain at least 10 separate departments or chairs, and in case the pedagogical work of the institution is to be accepted without examination, the

college must maintain at least 11 chairs, 1 of which shall be devoted exclusively to education, or at most to philosophy, including psychology and education. The heads of these departments shall be devoted exclusively to college work.

7. The graduates must, in addition to the 4-year college course, show the completion of a 4-year secondary course according to the standards established by the State board of education as entrance requirements to the collegiate courses of the institutions under the control of said board, and the standing and character of the institution and the nature of its equipment and work must be such as to entitle its graduates to admission to the graduate college of the State University of Iowa.

But, beginning January 1, 1912, the standard for accredited colleges shall be the following:

1. The number of class hours for the heads of departments and students shall not exceed 20 a week.

2. A faculty, properly qualified, shall consist of graduates of colleges who have pursued graduate work in residence at least 2 years, or an equivalent in acquired scholarship approved by the board of educational examiners.

3. The library shall consist of at least 7,500 volumes, selected with reference to college subjects, and exclusive of public documents.

4. The laboratory equipment, except in an institution inspected and approved by the board as a classical college only, shall be worth not less than \$7,500, and so distributed as to establish at least an efficient chemical, physical, botanical, and zoological laboratory.

5. The means of support is defined as requiring a permanent endowment of not less than \$200,000, or a fixed assured income or its equivalent, exclusive of tuition, of at least \$10,000.

6. The college must maintain at least 7 separate departments or chairs, and in case the pedagogical work of the institution is to be accepted without examination, the college must maintain at least 8 chairs, 1 of which shall be devoted exclusively to education, or at most to philosophy, including psychology and education. At least 5 heads of these departments shall in no case devote less than three-fourths of their class hours to college work.

7. The graduates must, in addition to the 4-year college course, show the completion of a 4-year secondary course according to the standards established by the State board of education as entrance requirements to the collegiate courses of the institutions under the control of said board, and the standing and character of the institution and the nature of its equipment and work must be such as to entitle its graduates to admission to the graduate college of the State University of Iowa.

In addition to the objective standard here set out, the character of the curriculum, the efficiency of instruction, the scientific spirit, the standard for regular degrees, the conservatism in granting honorary degrees, and the tone of the institution will be considered as factors in determining eligibility.

It will be observed from the above that the board will no longer group accredited colleges, but requires that all colleges meet the standard in force at any given time. The board will hereafter publish the list of accredited colleges, arranging the names of the colleges in alphabetical order, and after each name publish a detailed statement of data submitted.

A comparison of the data concerning institutions on the accepted list of the Carnegie Foundation (3d an. rep., 1909, pp. 40-45) and of the data concerning State universities (pp. 74-77) easily proves that the standards set by the Iowa State board of educational exam-

iners for 1916 is a fair one. This probably, with the inspections of the Bureau of Education, will demonstrate that the colleges of the country will fall into four groups and that the minimum for the "A" colleges will be at least that of the Iowa, 1916, standard (cf. p. 61); for the "B" colleges that of 1912 standard (cf. p. 62). A group of very small colleges with high scholastic standards should be rated in accordance with ratios deduced from the number of students and student hours. This might form group "C," in its way a group comparable with "A" and "B," and one to be highly respected and cherished. Group "D" would consist of small colleges that either on the ground of their youth might be rated as initial colleges, or if no longer youthful, should be recognized as junior colleges or collegiate institutes. Unless they can be immediately strengthened they should be advised to concentrate their work and to do thoroughly with high standards the work of the first two years of a college. Institutions of this sort should be reasonably numerous.

Incidentally the National Association of State Universities approximated a definition of a college in their report as to a university. (See p. 136, Chapter on Universities.) The Association of American Universities inclines to this definition. Both of these associations are waiting for reports of work proceeding under the United States Bureau of Education and the Carnegie Foundation. The appointment by the United States Bureau of Education of a specialist in higher education and the cooperation of the deans of graduate schools with the Association of American Universities and that of the State universities will lead to an intelligent basis for the possible rating and classifying of colleges.¹

The passing of definitions of standard colleges from academic and institutional uses to statutory uses in many States in a way to precipitate a national standard is marked by the reports of conferences of the chief State school officers of the North Central and Western States. The influence of the Iowa standards in this report is very marked, but it must be remembered the Iowa standards may be traced in their origin to those of New York and various associations. The conference of the chief State school officers at Salt Lake City, in November, 1910, adopted the following definition of a standard college or university:

To be considered a standard college all of the following conditions must be fully met:

1. The completion of a four-year secondary course above the eighth grade shall be required for college entrance.
2. The completion of 120 semester hours shall be required for graduation.
3. The number of class hours for the heads of departments and for students shall not exceed 20 a week.

¹ Cf. address of K. C. Babcock, Trans. and proc. of the Nat. Assoc. State Universities of the U. S. A., in 1910, pp. 112-115.

4. A faculty properly qualified shall consist entirely of graduates of standard colleges, and each head of a department shall hold at least a master's degree from a standard college or have attained eminent success as a teacher, which success shall be determined by the chief State school officer of the State in which the institution is located.

5. The library shall consist of at least 5,000 volumes, selected with reference to college subjects and exclusive of public documents.

6. The laboratory equipment shall be sufficient to establish efficient laboratories in all laboratory courses offered.

7. The means of support is defined as requiring a permanent endowment of not less than \$200,000, or an assured fixed annual income exclusive of tuition of at least \$10,000; provided that this requirement shall not be mandatory until 5 years after the institution has been recognized. The college must maintain at least 7 separate departments or chairs in the arts and sciences. In case the pedagogical work of the institution is to be accepted for certification, the college must maintain at least 8 chairs, 1 of which shall be devoted exclusively to education, or at least to philosophy, including psychology and education. The head of each department shall, in no case, devote less than three-fourths of his time to college work.

The Association of Collegiate Alumnae, while not specifically defining a standard college, has done so incidentally in setting out standards for admission to the association. An institution to be entitled to admission must show the following qualifications:

I. ADMINISTRATION.

(a) The board of trustees shall be so constituted as to support sound financial and educational methods.

(b) There shall be a reasonable recognition of women in faculties and in the student body and proper provision for the intellectual and social needs of women students.

(c) Much weight shall be given to the fact where women are on the board of trustees.

(d) In the consideration of a coeducational institution great weight shall be given to the fact that such an institution has a dean or adviser of women, above the rank of instructor, giving instruction and counted a regular member of the faculty.

II. DEGREES.

(a) The bachelor's degree shall be based on scholarly attainments represented by the following general conditions:

1. Entrance requirements such as demand at least 4 years of serious secondary school work for preparation.

2. Class sections restricted to such numbers as insure proper individual instruction, except in the case of purely lecture courses.

3. A residence of at least 2 years in the college conferring the degree or in a college of equally high grade.

4. Graduation requirements which correspond to the amount of work ordinarily included in 4 years of serious college study.

(b) The master's degree shall be given only for resident graduate work; or, in the case of the honorary degree, for original work of high distinction.

(c) The degree of doctor of philosophy shall not be given *causa honoris*.

III. FACULTY.

(a) The number of full professors shall be at least as large as the minimum number, and their ratio to the number of students shall be at least as large as the average number in institutions of the same type already admitted to membership.

(b) The ratio of the number of instructors to the number of students shall be at least as large as the average in institutions of the same type already admitted to membership.

(c) The salaries of the teaching staff shall not be lower than the minimum for the same grade in institutions already admitted to membership where the living conditions are similar.

(d) All members of the teaching staff, unless adequate reasons can be given for a few possible exceptions, shall hold degrees from colleges of recognized standing.

(e) A distinctly large proportion of the full professors shall hold degrees based on graduate university work.

(f) There shall be no preparatory department under the government or instruction of the college faculty.

IV. MATERIAL RESOURCES.

(a) The number of laboratories shall not be less than the average number in institutions of the same type already admitted to membership.

(b) The number of books in the library shall not be less than the average number in institutions of the same type already admitted to membership.

(c) The number of departmental journals regularly placed in the libraries shall not be less than the average number in institutions of the same type already admitted to membership.

(d) The total property shall not be less than the minimum.

(e) The productive endowment shall not be less than the minimum.

(f) The income per student shall not be less than the average.

(g) No coeducational institution shall be considered in which there is not special provision, through halls of residence or in other buildings, for the social life of the women students.¹

SUMMARY.

Requirements for admission.—The increase in the quantity of admission requirements of the colleges has risen in the decade from 8 units to 12 as a minimum and 14 as a standard in the Southern States. In the Northern States, east and west, the requirements increased from a minimum of 12 to a maximum of 16 units. The majority of the institutions require 15 units for first-year classification, but admit with conditions on 14 or even 13½ units. Almost absolute uniformity, however, is in sight on the basis of the rejection of candidates who do not have 14 units and a tendency to abolish admission with conditions.

The terminology of the measure of admission requirements has become almost fixed and universal. The recommendations of the national conference committee on standards of colleges and secondary schools, adopted in January, 1911, present the general practice, and these recommendations have been already accepted by the North Central Association of Colleges and Secondary Schools:

Resolved, That this committee recommends, as a matter of convenience and to secure uniformity—

(1) That the term "unit" be used only as a measure of work done in secondary schools, and that the term "period" be used to denote a recitation (or equivalent exercise) in a secondary school;

¹ Rep. Commis. Educ., 1909, vol. 1, pp. 59-60.

(2) That the term "hour" be restricted to use in measuring college work, and that the term "exercise" be used to denote a recitation, lecture, or laboratory period in a college;

(3) That "unit" be used as defined by this committee, the Carnegie Foundation, and the College Entrance Examination Board, and that "hour" be used preferably in the sense of year-hour; and

(4) That the use of other terms, such as "count," "point," "credit," etc., in any of these senses be discontinued.

The objection that there may be a mere mechanical standardization by the use of a defined unit or "counter" is well met in a chapter on the use of the "Recommendations of a Standard Unit in Secondary Education" in the Carnegie Foundation Fourth Annual Report, 1909, pages 131-133.

The flexibility of entrance requirements has become well-nigh universal, that is, the required specified subjects have been widely reduced to a minimum of about 8 units out of 15. There is also almost an agreement as to the subjects. The present standard may be said to be: English, 3 units; mathematics, $1\frac{1}{2}$ to $2\frac{1}{2}$ units; foreign language, minimum 2, maximum 4 units. There is a tendency to make history a constant at 1 unit, and some science at 1 unit. The 7 elective units until very recently have been established subjects for instruction. The latest largely successful move is to allow a limited number of units in the so-called newer subjects, the industrial subjects of manual training or domestic science, and agriculture, drawing, fine arts, and music. The flexibility of entrance requirements was carried to an absolute degree by Clark College in accepting the graduates of any New England high school or any other high school with an equivalent standard. This practice is limited, but prevails in representative institutions among the colleges we have selected, like Albion, and among the universities, like Leland Stanford. The statement of the High School Teachers' Association of New York City on the articulation of high school and college or the reorganization of secondary education concedes that this practice may seem too radical and recommends a high degree of flexibility as urgent. The statement argues:

There are seven distinct lines of work which we believe essential to a well-rounded high-school course, to wit, language, mathematics, history and civics, science, music, drawing, and manual training. Girls must be taught household science and art. Moreover, we believe that the twentieth century demands that the high schools should not cast all students in the same mold; that the amount of science and manual training which is sufficient for one student is utterly inadequate for another; and that a training for business may be given in the high school which will be as cultural and as respectable as any other course. To enable the high schools to adapt secondary education to the varying needs of different students in such a manner as to meet the diverse demands of the professions, of industry, and of commerce, progress seems to us to require—

(a) The reduction in the number of so-called "required" subjects, together with

(b) The recognition of all standard subjects as electives.

The specified entrance requirement of two foreign languages, the meager electives in science, and the absence of recognition for drawing, music, household science and art, shopwork, commercial branches, and civics and economics constitute the chief difficulty.

We should like to see it possible for a student upon entering the high school to choose Latin or German or French; to confine his work in foreign language, during his high-school course, to one such language in case the remainder of his time is required for other subjects; and to find at the end of his high-school course that he has met the foreign language requirements of whatever college he may choose to enter. We should like to see no discrimination against Latin for the course leading to the B. S. degree, so that students choosing any language may enter the B. S. course.

We should like to see the following subjects recognized by college entrance credits:

Music, 1 unit; mechanical and freehand drawing, each $\frac{1}{2}$ to 1 unit; household chemistry, botany, zoology, physiography, applied physics, and advanced chemistry, each 1 unit; modern history, 1 unit; civics and economics, each $\frac{1}{2}$ to 1 unit; household science and art, 2 units; and commercial geography, commercial law, stenography and typewriting, elementary bookkeeping, advanced bookkeeping, and accounting, each $\frac{1}{2}$ to 1 unit.

A recent study of entrance requirements shows that many colleges are already requiring only one foreign language for admission, and that many of the above subjects have received recognition.

Incidentally it is interesting to note the testimony of Inspector Aiton that where the new subjects have been freely welcomed the old standard subjects have held their own in competition with the new subjects.¹

The new entrance requirements of the University of Chicago (cf. p. 44) as well as of Harvard (cf. p. 42) fully meet the desires of the statement of the High School Teachers' Association of New York City. The report of the committee of nine on the articulation of high school and college at the National Education Association in July, 1911, was largely forstalled, therefore, by the action of Harvard, Chicago, and the practice of a number of the leading universities and colleges.

It is evident that the quality of the work which was in danger of being lost in the emphasis put upon the quantity and kind of work has been safeguarded by the carefully wrought-out definitions of units by the associations, by the College Entrance Examination Board, by the newer methods of gauging the candidate through a personal acquaintance with him and with his records, and by a general evaluation of his accomplishment and powers in a well-balanced curriculum in a standard institution. The long-drawn-out battle as to methods of admission by examination or certificate in one sense has been won by the certificate method, but fortunately not by the mere paper certificate. That method has been supplanted by examinations in some subjects or the examination of the student's entire record and by the test of his record as a college entrant and by the increasing systematic and sympathetic inspection of the schools. Since the

¹17th An. Rep. of Inspector of State High Schools, Minnesota, for school year ending July 31, 1910.

modification of Harvard's plan, almost the sole protagonists of the examination method pure and simple are Yale, Princeton, and Bryn Mawr.

Requirements for graduation.—The standard requirement for graduation is 60 year or 120 semester hours of purely scholastic work, with the addition of from 4 to 6 hours for required physical training. As a rule, the subjects for the freshman year are required with some option. English is the only absolute constant. The standard is taking shape by which the sequences in subjects must be pursued in accordance with the preparation brought from the high school. This law of sequences, together with the principle of prerequisites for advanced studies, either specifically set out or resting upon the direction of an adviser, is reestablishing a flexible group system adapted to the individual in place of the absolutely free elective system. The practice of having "majors" and "minors" is almost universal for at least 2 years, and has extended itself widely through the last 3 years. The arrangement of the cognate studies of the curriculum into 3 or at most 4 groups or categories and the requirement of a minimum amount of work in each group in the supposed interest of preserving the liberal element in education, restores practically a prescribed course of study. The more or less natural division of the college course at the beginning of the junior year, due to the preparation and age of the average student, the completion of the secondary studies and the demands of professional and technical education, reenforced by the taste of specialization given by "majors," justify the definitions of a standard college which recognize in effect a junior and a senior college (cf. North Central definitions of the standard college, p. 58). Attention to the quality of collegiate work has been revived by the grading of studies (cf. pp. 46, 54), the stimulus of marking systems and honors (cf. p. 54), and the privilege of extra work (cf. p. 54), to say nothing of the increasingly stricter administration of the colleges and the elimination of the unfit.

Qualifications of instructors.—Qualifications of the staff of instruction over and above the old ones of character, personal caliber, and power to teach, are advanced work beyond the bachelor's degree usually taken in a university, and in travel. Measured by mere degrees, the standard would be the possession of a Ph.D. degree or its equivalent for the colleges of the highest rank. The possession of a master's degree or its equivalent represents the present status. The average hours of class instruction for a teacher range from a minimum of 5 in some universities like Johns Hopkins to 12 or 15 in the best colleges, with a maximum of 20 in the weaker colleges. Much emphasis is put upon having the collegiate instruction separate from that of the secondary school or academy.¹

¹ For the average requirements for equipment in buildings, libraries and laboratories, and income, cf. The Iowa Standards, p. 61.

The spirit and ideals of the college defy objective standards. The traditions regarding American colleges have been handed on from professor to professor, so that every true college has an atmosphere. The proof of this is in the consecration of the professors to their life work—a consecration so great that they live upon low salaries and impart a passion for truth and learning for their own sake. The much-abused word “culture,” when properly understood, not as a matter of esthetic sentiment but of genuine sympathy with intelligence, is a note of the true college. No college organized for commercial profit answers the test or can long preserve the spirit and ideals of the college.

CHAPTER II.

STANDARDS OF THEOLOGICAL SCHOOLS.¹

The first instruction in theology in the United States began with the opening of Harvard College. A leading purpose of its founders is expressed in one of their sentences: "Dreading to leave an illiterate ministry to the churches when our present ministry shall lie in the dust * * *." In 1654 a fourth year was added to the college course, originally of 3 years, in order to prepare more thoroughly for the ministry. The first professorship instituted in the university was the Hollis professorship of divinity in 1721. The differentiation of the divinity school from the college was very gradual. Its faculty was not formally organized earlier than 1819. This was the year in which the first annual catalogue was issued. Before this in the sheets, or broadsides, the theological students evidently were included under the head of resident graduates. This year the catalogue sets out "candidates for the ministry and theological students. The candidates are designated by italic characters." The theological students numbered 38, in a total attendance of 383. The organization of the theological school, together with those of the schools of medicine and law, is first indicated in the catalogue for 1827-28. "The apprentice system," by which the college graduate read divinity in residence with some pastor, prevailed or supplemented the theological studies of the college course until well into the nineteenth century.

At the beginning of the nineteenth century, doubtless much stimulated by the theological controversies of the day, theological seminaries were founded. Yale, founded in 1701, like Harvard, emphasized theological education in the college, as the words of the charter show: "With zeal for upholding and propagation of the Christian Protestant religion by a succession of learned and orthodox men * * * who through the blessing of Almighty God may be fitted for public employment, both in the church and civil state."² The theological department became famous in the first quarter of the nineteenth century.

In 1809 the proposal to establish a theological seminary for the Presbyterian Church was introduced to the general assembly, which submitted three plans, 1, to establish one school near the center of

¹ In the chapters of this bulletin the term "school" is used generically unless the technical definition of a school recommended by the Association of American Universities and the National Association of State Universities is specifically named. Cf. p. 142, university chapter.

² An Act for Liberty to erect a collegiate school of the Colony of Connecticut.

the church; 2, to establish one school in the North and one in the South; 3, to establish a school in each synod. In 1811 the general assembly adopted a plan for a single school, and in 1812 located it at Princeton.

In the same period Andover Seminary was founded by the Congregationalists in Massachusetts, and the various denominations and even schools of thought in the denominations founded their schools. With the exception of a few denominations, who were rather opposed to a "learned ministry," nominally the requirements for admission from the beginning were college graduation. The doors, however, were open with various limitations for noncollege graduates. The present requirements are more strict with reference to the possession of a bachelor's degree, but almost without exception provision is made to take care of those not graduating.

REQUIREMENTS FOR ADMISSION.

The requirements for admission of the following institutions show the prevailing standards:

Harvard.—Candidates for degree: Bachelor's degree from approved institution, or education "equal to that of graduates of the best New England colleges"; testimonials.

Special students: Same. Students may choose any course they are prepared for, but not neglect certain ones.

Yale.—Those who have no degree must "show by certificate or examination" that they have "the substantial equivalent of a college training."

Special students: Those are admitted who show "superior scholarship" as candidates for degree.

Senior B. A.'s may elect part of junior divinity work.

Princeton.—A. B. or other degree; or an equivalent certificate; or examination on usual collegiate studies of classical course; credentials.

Special students: May receive certificate for work done, or by examination become regular students. "Hospitality of the seminary may be extended to any accredited persons."

Union.—Graduation from "college of recognized standing," or by examination; credentials and other testimonials.

Special students: From those not graduates, Regent's classical academic diploma covering 6 subjects, or certificate that they have satisfied entrance requirements of "some reputable college."

Catholic.—For advanced course, must have completed "a classical college course," with 2 years in philosophy and 3 in theology.

Special students: For elementary course; the "classical college course" and 2 years in philosophy.

McCormick.—"A regular course of collegiate study;" elementary Hebrew recommended; church credentials.

Special students: Special recommendations from presbytery and admitted first half-year on probation.

Vanderbilt.—"Classical education at some reputable college" desirable, but lack of such does not debar; testimonials.

Special students: Students without college training must take course in literary expression; testimonials.

Chicago.—"Diploma of an accepted college;" Greek may be required and credited.

Special students: Without examination, if they can show reason, or if they are prepared to profit by the course; English theological seminary open to pastors, students, and religious workers who have not had college course.

REQUIREMENTS FOR GRADUATION AND DEGREES.

The courses at the beginning prescribed under the influence of the elective system have admitted a minimum amount of electives not to exceed one-third of the course. Where the elective system has not been recognized, a group system has been established in accordance with the purpose of the student in his future service. It is interesting to note the progress of specialization in the field of theology, due not only to the breadth of the subject but to the demands of the complexity of modern civilization.

The conferring of degrees in course in theology, outside the practice of the Roman Catholic Church and the representatives of European State churches, is recent. The first degree of bachelor of divinity given in connection with graduation was first instituted at Harvard in 1869. Almost uniformly the course is 3 years in length. In certain institutions the combined liberal arts and theological course is recognized, by which a year may be saved either in the four-year liberal arts course or in the theological school. A four-years' theological course has also emerged in schools connected with churches, encouraging specialization in the science of theology or on the practical side in applied Christianity.

The following are the requirements for graduation and degrees from the typical schools selected:

Harvard.—14 courses (a course generally equals 3 hours per week through the year); not more than 6 in any one year; $3\frac{1}{2}$ courses necessary for promotion to middle class, 8 to senior class. Courses of Andover Theological Seminary may be counted, and so may 2 courses from faculty of arts and sciences.

Yale.—A course of 3 years "in this or some other equivalent school" admits to "graduate standing"; one course and approved thesis; 3-year course in "department of pastoral service" leads to B. D.

Princeton.—1,444 hours of instruction, or 16 hours for 3 years of 30 weeks each. Three years of residence "in this or some other approved seminary" and satisfactory completion of all studies in regular course, and one of the B. D. courses made up of "extra curriculum" studies.

Union.—Diploma without degree does not require Greek and Hebrew.

Advanced degree: Offers D. D. for 3 years' postgraduate work; a part of this time may be spent elsewhere. Candidate must read Latin, Greek, Hebrew, French, German, and publish thesis.

Catholic.—S. T. B. conferred after finishing "seminary courses of philosophy and theology"; Hebrew or examination in Hebrew or interpretation.

Advanced degrees: For S. T. L., 2 years in postgraduate study; taking 3 courses of study, 2 of which must be in faculty of theology; written dissertation with public defense of the dissertation, and 50 theses. For S. T. D., 2 years elapse after examination for the licentiate; dissertation and 75 theses to be defended. For J. C. B., "full seminary course," including 1 year of canon law. For J. C. L., 2 years' study of the text

and of public law; dissertation, and 50 theses. For J. C. D., "2 additional years," printed dissertation; 75 theses, publicly sustained.

McCormick.—Three years of 17 hours per week; in junior year, all work prescribed; in middle and senior year, 13 hours prescribed; 2 hours elective. Graduate students may receive degree on attainment of 12 credits and thesis. A credit is a course of 30 hours; 46 credits requisite for graduation and 56 for B. D. degree, of which 42 are prescribed.

Vanderbilt.—Degree conferred on those "who complete one of the degree courses" and have a baccalaureate degree of recognized college; others may qualify by doing extra work.

Chicago.—27 majors (17 majors are same for B. D. and Ph. D. degrees); 18 must have been pursued in "a theological school of high standing," and not less than 9 at this university. Requirements for examination nearly same as for Ph. D.

COMMISSION ON PRE-THEOLOGICAL COURSE.

The beginning of the unification of standards appears in the appointment of a commission on study preparatory to the theological seminary appointed at a meeting of the Religious Education Association in Chicago in 1909. The following resolution was adopted:

That a committee of 12 be appointed, representing endowed institutions of advanced education as well as State universities for the purpose of formulating an ideal or suggestive course of collegiate study preparatory to a course in a theological seminary.¹

The commission presented the following memorandum of report at the meeting of the association in March, 1910:

1. Your committee at first attempted to draw up a complete curriculum for the four college years. Such a curriculum, however, was seen to be impracticable on account of the different studies, number of hours, and other conditions required by different colleges for their degrees. It seemed best, therefore, to the committee to draw up a list of courses which are especially adapted to prepare men for work in theological seminaries.

2. It has seemed advisable further to distinguish between two classes of courses: Those which seem absolutely essential in training for *practical* efficiency in the ministry (list A); and those which are highly important for the development of the more *technically theological* efficiency of the ministry (list B).

It is the recommendation of the committee that the studies in list A be pursued by all students for the ministry; and that course B be pursued by those who wish to prepare themselves in the fullest degree for the philological and exegetical studies of the seminary curriculum. In so far as the student's aptitude and opportunities permit the committee would suggest that the studies in both lists be pursued.

3. As regards the amount of time to be given to each study, the committee has chosen as its unit a course running 3 hours a week for an entire college year. In colleges where a given study fills a different number of hours per week the adjustment will be easily made.

The committee further assumes that the total number of hours per week required in a college will not exceed 15 or 16.

The committee has deemed it best to leave a certain number of units free for electives, permitting more thorough study of such courses of the suggested curriculum as particularly appeal to a student.

4. The student is advised to consider the instructor as well as the course. In case a course is given by an inferior instructor the committee advises that the student

¹ U. S. Bureau of Educ., 1909, p. 44.

substitute for it some other course in the corresponding group in the other list, or if more advisable even in some subject not suggested. It is the opinion of the committee that the influence of the teacher is as important as the material of a course.

LIST A.—Courses recommended for the practical efficiency of the ministry:

	Units of 3 hours per week for year.
<i>I. Preparation in literary expression:</i>	
English composition and rhetoric.....	1
Literature (principally English).....	1
Public speaking (art of expression, vocal training, debating, etc.).....	1
The student should take as much as possible of such work even when no academic credit is given for it.	
<i>II. Languages:</i>	
At least one foreign language, preferably Greek.....	2
<i>III. Natural science:</i>	
Biology.....	1
Psychology.....	1
<i>IV. Social science:</i>	
History.....	2
Political economy.....	$\frac{1}{2}$
Study of society (introduction to the study of sociology, dependents, etc., socialization, social science).....	2
<i>V. Philosophy:</i>	
History of philosophy.....	1

LIST B.—Additional courses suggested as important preparation for technical theological study from which elections can be made:

<i>I. Languages:</i>	
Latin.....	2
German (if not taken in high school, otherwise 1).....	2
Hebrew (for those whose aptitude and desires would lead them to pursue Hebrew in seminary courses).....	1
Hellenistic Greek.....	1
<i>II. Natural and physical science:</i>	
Geology.....	1
Physics or chemistry.....	1
<i>III. Philosophy:</i>	
Ethics.....	$\frac{1}{2}$
Introduction to philosophy.....	$\frac{1}{2}$
Logic.....	$1\frac{1}{2}$

The Rev. Dr. William D. McKenzie, of Hartford Theological Seminary, a member of the commission, in an article¹ presents the objections to a standardization of theological education. He holds that there are 3 elements in religious education: First, religious fervor; second, theological orthodoxy; third, intellectual discipline.

He believes it is admitted no one can standardize religious fervor, and inquires who shall standardize orthodoxy, and therefore concludes with a query, "What is the practical *religious* use of standardizing theological scholarship without regard to those other two factors of actual power?" He thinks, therefore, that full standardization is impossible in the field of theological education if by that we mean a standard that should be practical for all the churches.

It is, however, most significant to the student of standards that Dr. McKenzie after his forceful presentation of the objections to standards in the most difficult field of all, subject to the odium theologium, concludes his paper with the expectation of the continuance of standardization.

¹ Religious Education, August, 1910, pp. 275-277.

² Ibid., 1911, pp. 253-261.

CHAPTER III.

STANDARDS OF MEDICAL SCHOOLS.

As in theology the student, ordinarily a college graduate, read with a minister, so in medicine, ordinarily without being a college graduate, the student was actually indentured to a physician whom he served in all possible ways until he shared in the practice. This system still survives in a shadowy way in the requirement for admission in some medical schools of a recommendation from the "preceptor." The first faculties of medicine were organized in Philadelphia between 1765 and 1791, were followed by inchoate medical departments in King's College in New York, in Harvard, Dartmouth, and by 1810 in Yale, and were in connection with universities.¹

Harvard affords a good illustration of the origin of a school. In the year 1780 Drs. Samuel Danforth, Isaac Rand, Thomas Rust, John Warren, and others formed an association, the Boston Medical Society. On November 3, 1781, this society voted that Dr. John Warren be desired to demonstrate a course of anatomical lectures the ensuing winter. Dr. Warren drew up a scheme which was placed before the corporation September 19, 1782. Twenty-two articles were adopted, among which was the establishing of "a professorship of anatomy and surgery, a professorship of the theory and practice of physics, and a professorship of chemistry and materia medica." Further, it was required that each professor be a master of arts or graduated bachelor or doctor of physics, of the Christian religion, and strict morals.

The professors lectured in Cambridge in 1783; a few medical students and such seniors as had obtained the consent of their parents attended. Three years' study, with attendance on two courses of lectures—in some cases reduced to attendance on one course, the longest being only four months—were required of those who presented themselves as candidates for a degree. Students not graduates of the college had to pass preliminary examinations in the Latin language and in natural philosophy.

In imitation of the London schools, early in the nineteenth century, as against the Edinburgh or Leyden example followed by the earlier schools, a proprietary school was started in Baltimore. This school, with its many later followers, gave a particularly American and

¹ Cf. Packard, *History of Medicine in the United States*; and *Medical Education in the United States and Canada*, Abraham Flexner, Bull. No. 4, Carnegie Foundation, 1910.

unfortunate development to medical education. Private and often commercialized schools, separate from the stimulus and standards of universities, produced in little more than a century 457 so-called medical schools. Indeed, there was almost a transfer of medical education to the proprietary medical schools.¹

As yet there were no State boards. The school diploma was a license to practice. Applicants who could pay their fees or even sign notes were likely to be accepted and graduated after superficial oral examinations. (Flexner, p. 7.) Before long even the medical faculties of Harvard, Yale, and Pennsylvania became largely independent of the university, disposing of professorships by common agreement, segregating and dividing fees after the fashion of the proprietary schools. Not until the eighties of the nineteenth century did the universities begin to recover these schools. There were no established requirements for admission. The sessions of the school were only 16 or 20 weeks each. The courses were not graded. The methods of instruction were didactic, with the same lectures read from year to year.

Laboratories were scarcely known, though, as we see in the introduction (p. 10), in liberal arts colleges they began to appear early in the nineteenth century in the sciences. Clinical facilities were referred to in announcements, but amounted to little.

About 1830 Yale medical school went so far as to procure legislation to lengthen the term of medical study and establish something of preliminary education, but receded from its position.²

In 1835 the Medical College of Georgia suggested concerted action to cure the prevalent abuses, but the beginning of a reform movement is to be dated from the call of the medical society of the State of New York, which led to the formation of the American Medical Association, as follows:

Whereas it is believed that a national convention would be conducive to the elevation of the standard of medical education in the United States;

Whereas there is no mode of accomplishing so desirable an object without concert of action on the part of the medical societies, colleges, and institutions of all the States:

Resolved, That the New York State Medical Society earnestly recommends a national convention of delegates from medical societies and colleges in the whole Union to convene in the city of New York on the first Monday in May, 1846, for the purpose of adopting some concerted action on the subject set forth in the foregoing preamble.³

The Association of American Medical Colleges, the American Medical Council, the organization of the Johns Hopkins Medical

¹ See Dr. William Henry Welch's Address before the 65th Convocation of the University of Chicago, Dec., 1907. President Henry S. Pritchett, "The place of the university in medical education," *Amer. Med. Assoc. bull.* Jan. 15, 1910, p. 289; also under "Relations of the university to the medical school," President Schurman, 299, Dean Vaughan, 397, President MacLean, 312.

² See Wm. H. Welch, "The relation of Yale to medicine." Reprint *Yale Med. Jour.*, Nov., 1901; Flexner, p. 10.

³ First an. conf. of Council on Med. Educ., *Amer. Med. Assoc.*, Chicago, Apr. 20, 1905, p. 5.

School in Baltimore in 1893, the lengthening of the course of study to 4 years at Harvard in 1892-93, and the grading of studies in 1899-1900 are milestones of the progress of the movement. A phenomenal fruition has come, however, in the last half dozen years, due chiefly to the conferences and work of the Council on Medical Education of the American Medical Association in conjunction with the representatives of State and Territorial licensing and examining boards, the Association of American Medical Colleges, the Southern Medical College Association, and the Government medical services.

Through the work of the Council on Medical Education, created in 1904, the first personal inspection of all medical colleges was made by representatives of the council in 1905-6 and 1906-7. The first classification of medical colleges by the council was presented to the house of delegates of the American Medical Association in 1907. The second tour of inspection of all medical colleges by the council was completed in 1909-10. The second classification of medical colleges was reported to the house of delegates, and published in 1910.

The first conference was held in Chicago in 1905. Delegates from other bodies and universities have been invited to succeeding conferences. No more marvelous chapter in the history of educational standards can be found than in a review of the work of these conferences, as shown by the report for the first five years.¹

REPORT OF THE COUNCIL ON MEDICAL EDUCATION FOR YEAR ENDING JUNE 1, 1909.

For five years the Council on Medical Education has been working for higher and more uniform standards of medical education. In this time many changes for the better have been brought about. Such influence as the council may have had toward these improvements has been due largely to the following facts:

1. The council is the committee on education of the medical profession of America, represented by the American Medical Association. As such, its interests are national and its object is the betterment of medical education in all sections of the country.

2. It is a permanent committee, thereby exerting a constant, steady influence for improvement, not possible through temporary committees, however excellent their work might be.

3. Its headquarters at the home of the medical profession of America and its connection with the Journal of the American Medical Association, with its extensive body of correspondents, made it possible to obtain much information which otherwise could not have been secured.

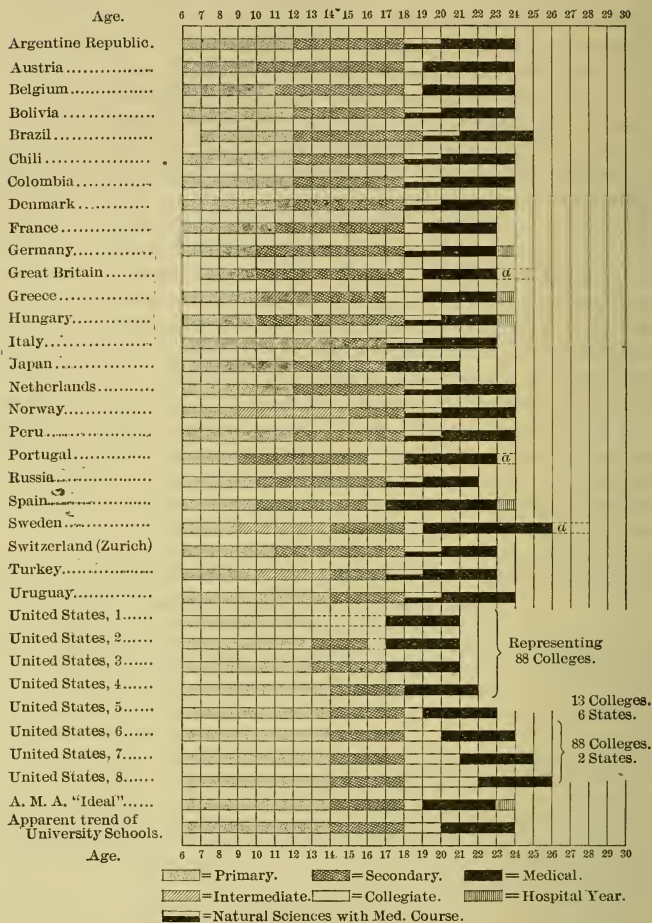
4. An abundance of information has been collected, tabulated, and published regarding medical colleges, standards, students, graduates, facilities, and equipment, as well as much information regarding the requirements for license to practice medicine, both in this country and abroad. Information has also been collected regarding elementary, secondary, and collegiate education.

5. This information, formerly not available, has thrown much light on medical education, revealing quite clearly problems which otherwise could not have been seen.

6. As problems have arisen they have been presented at annual conferences on medical education for discussion. These annual conferences have been held under the auspices of the Council on Medical Education and to them are invited as delegates

¹ Proc. of the House of Delegates of the Amer. Med. Assoc., 1909, pp. 13-14.

PRELIMINARY AND MEDICAL EDUCATION AT HOME AND ABROAD.



those who are interested and whose advice and influence may be helpful in elevating the standards of medical education—from the State licensing boards, State medical societies, confederation of examining boards, college associations, and the United States services, as well as from colleges of liberal arts and other interested organizations. They have been attended by an increasing number of delegates each year. They are entirely informal and are devoted to the discussion of the more urgent problems of medical education, the reports of which have been given wide circulation in the columns of the *Journal of the American Medical Association* and by reprints. These conferences have undoubtedly been a strong influence favoring higher and more uniform standards.

It might be well to briefly review the work of the five annual conferences.

FIRST CONFERENCE.

The first conference was held in Chicago April 20, 1905. At this conference the questions of preliminary education, medical curriculum, and the relation of the college of liberal arts to the medical school were discussed, as a result of which the council formulated the following as the minimum standard of the American Medical Association:

(a) A preliminary education sufficient to enable the student to enter the freshman class of our recognized universities, (b) the passing on the credentials of such an education by a State official, (c) the graduation from an approved medical college requiring a 4 years' course of not less than 30 weeks each year, with 30 hours each week of actual work, (d) the passing of an examination for licensure before a State board.

The council further formulated a so-called ideal standard which should be secured as rapidly as the conditions throughout the country warranted. This ideal standard was briefly as follows:

(a) A 4-year high-school education, (b) a year's university training in physics, chemistry, and biology, (c) 4 years of medicine proper, and (d) 1 year as interne in a hospital or dispensary.

THE SECOND CONFERENCE.

At the second conference, held in Chicago May 12, 1906, probably the most important facts presented were the standings of the various medical colleges based on the failures of their graduates in examinations before State boards. The colleges were divided into 3 groups: Those having less than 10 per cent of failures, those having from 10 to 20 per cent, and those having above 20 per cent. A fourth unclassified list was made of those colleges which had insufficient data to permit of comparison. These reports, which are published annually in the State board statistics prepared by the council, have been productive of much good in stimulating faculties to guard against the graduation of illy prepared students.

THE THIRD CONFERENCE.

At the third conference, held in Chicago April 29, 1907, a detailed report of a personal inspection made by members of the council of all the medical schools of the United States was presented. In this inspection the schools were marked on a civil-service basis consisting of 10 points covering the essentials of a modern medical college, these 10 points making a possible 100. And on this basis the colleges as graded were divided into 3 groups. The result was as follows: An acceptable group of 82 colleges with marks from 70 to 100, a conditioned group of 46 colleges with marks from 50 to 70, and a rejected group of 32 colleges with marks below 50.

This personal inspection of colleges has been continued and a second inspection will soon be completed.

THE FOURTH CONFERENCE.

The fourth annual conference, held in Chicago April, 1908, was from many stand-points most encouraging and interesting. The secretary presented a graphic study of medical education in the various States of the Union and in the 20 most important countries of the world, showing the comparative position of medical education in this country with that of the rest of the world.

It was revealed that, while this country had a few medical colleges equal to any in the world, it was nevertheless far behind other nations in standards of both preliminary and medical education. More encouraging was the report of a campaign carried on during the year by the council to secure the adoption by medical colleges of higher preliminary standards. This report brought out the fact that more than 50 first-class schools in this country had agreed to accept what has been adopted by all the rest of the world, i. e., a 5-year medical course. This is to be brought about by adding to our present preliminary requirements of a 4-year high-school course at least 1 year of physics, chemistry, and biology.

This advance requirement has become so general that it will doubtless be adopted by all first-class schools within the next few years and thus place American medical education on a par with that of England, France, Germany, Austria, Canada, in fact with that of all our neighbors and rivals in progress and civilization.

THE FIFTH CONFERENCE.

At the fifth annual conference, held in Chicago, April 5, 1909, the chief feature was the report of a committee on medical curriculum. This committee consisted of 100 prominent educators, representing all the departments and specialties in medicine. It has done a splendid piece of work, which we feel is most important and timely, since we are just entering on what we believe will prove to be the greatest reconstructive period in the history of medical education in America. The recommendations of this committee on what constitutes a proper medical course are most interesting and have already attracted much attention.

A curriculum of 4,100 hours was agreed to, divided among the various departments as follows:

Hours.

I. Anatomy, including histology and embryology.....	700
II. Physiology and physiologic chemistry, including 80 hours of organic chemistry.....	530
III. Pathology and bacteriology.....	500
IV. Pharmacology, toxicology, and therapeutics.....	240
V. Medicine, including pediatrics and nervous diseases.....	890
VI. Surgery: General and special.....	650
VII. Obstetrics and gynecology.....	240
VIII. Diseases of the eye, ear, nose, and throat.....	140
IX. Dermatology and syphilis.....	90
X. Hygiene, medical economics, and medical jurisprudence.....	120
Total.....	4,100

It was the unanimous opinion of the committee that a hard and fast medical curriculum, uniform for all colleges, was not desirable and not for the best interests of medical education. It was definitely stated, therefore, that the curriculum recommended by this committee was to be regarded as suggestive and educational only, and was not intended for adoption as an absolute and fixed requirement either by medical colleges or by State boards. The curriculum reported does not represent a minimum requirement, but one which is sufficiently comprehensive to meet the present demand of medical education.

A summary of the result of 7 years' study is thus stated in 1911: ¹

¹ Bul. Am. Med. Assoc., Jan. 15, 1911, 70-71.

The Council on Medical Education has been at work for 7 years with the problem of medical education in America. In these 7 years we have studied the conditions pretty thoroughly, so that we are now ready to present, from our statistics and from our investigations, a full and complete picture of medical education as it is, and what it should be, to-day in America.

We are all now familiar with the fact that American medical education is not in a satisfactory condition. We still have a large number of very poor schools, there being now altogether 129 medical colleges in this country. Six years ago there were 166. Of the 129 colleges which remain, however, not more than 60 or 70 are doing really acceptable work, or are making improvements which will enable them to do acceptable work. Possibly one-half of our medical schools are still in such a condition that it would be fortunate for American medical education and for the American people if they should be discontinued. Fortunately, this reduction is taking place and the proprietary schools are rapidly passing out of existence.

THE AMERICAN STANDARD OF MEDICAL EDUCATION.

Those of us who are familiar with the situation believe that modern medical education needs a training in a good secondary school; a premedical course in the sciences of physics, chemistry, and biology; a thorough 4-year course in a medical school, and lastly a practical year as an interne in a hospital. I think we all agree on that as a minimum training necessary to prepare a student for independent practice. That would mean essentially a minimum of 6 years of training necessary to prepare a student for independent practice. That would mean essentially a minimum of 6 years of training from a high school. While it is evident that such a requirement could not at once be put into force throughout the whole country, nevertheless I state without any hesitation that anything short of that as the ultimate requirement appears to me to be insufficient.

At a meeting of the American Institute of Homeopathy, held in Detroit in 1909, the number of hours of the medical course was made 4,300, devoting the 200 extra hours over that adopted by the American Medical Association (4,100 hours) to materia medica and therapeutics. The standard for the entrance examination is a 4-year high-school course or its equivalent. Two colleges of homeopathy require more. Those of the Universities of Michigan and of Iowa require two years of liberal arts study.

The present general standards, therefore, appear in the report for 1911 of Dr. Colwell, secretary of the council:

Indeed, nothing should be said to disparage the excellent and commendable work long carried on by such agencies as the Association of American Medical Colleges, the American Academy of Medicine, the State Medical Licensing Boards, both individually and in their confederations, and by other organizations. At the same time, however, any positive action taken by a national body, such as the American Medical Association, representing as it does the organized medical profession of the United States, was sure to have an extensive influence. For that reason active work on the part of the American Medical Association through its Council on Medical Education gave added impetus to a nation-wide movement for better standards of medical education, which, by reenforcing the activities already under way, has resulted in the remarkable progress made during the last several years. Incidentally it should be stated that the work of the Council on Medical Education has been recognized abroad¹ and

¹ See Journal A. M. A., Aug. 6, 1910, p. 508.

the council has been listed by Dr. P. J. Eijkman, of The Hague, among the organizations of the world which are exerting an international influence in matters pertaining to medical education. Dr. Eijkman says that if the efforts of the Council on Medical Education bear fruit, and if its example is followed, "the time is not far distant when an international standard of requirements for the practice of medicine will be reached."¹

IMPROVEMENTS IN RECENT YEARS.

Changes for the better in medical education have been particularly rapid since 1904, when the Council on Medical Education was organized. Up to that year the number of medical colleges, mostly of the proprietary variety, continued to increase, regardless of the frequently published references to the overcrowded condition of the profession and regardless of reports frequently presented showing the need of better rather than a larger number of medical colleges. The increase in number continued until, in 1904, the maximum of 166 medical colleges was reached, constituting, to use a phrase often repeated of late, practically half of the world's supply. The numbers of medical students and medical graduates likewise increased until 1904, when the highest totals were reached. In that year there were 28,142 medical students and 5,747 graduates.

FEWER BUT BETTER COLLEGES.

Since 1904, however, there has been at first a gradual and then a positive decrease in the number of colleges until now the number has been reduced to 129 [116 in 1912]. It is significant to note that the positive decline has been since 1907, when the classification of medical colleges, based on the council's first actual inspection of all the medical colleges of the United States, was read at the third annual conference. Of the 44 colleges closed since 1907, 20 colleges, were closed outright and 24 by merging with others. Of the 20 which became extinct, 16 had been rated in class C. This decrease, therefore, has been due to the closing of the weak and inferior colleges or by the merging of two or more medical colleges, forming in practically every instance one stronger and better equipped college. Rather than being a serious matter, therefore, this decrease in the number of medical colleges has been of positive benefit, resulting as it has in the formation of better colleges and in the elevation of educational standards. Since 1904 there has likewise been a decrease in the number of medical students and medical graduates.

Colleges closed since 1907.

How closed.	Class A.	Class B.	Class C.	Total.
By merger.....	11	10	3	24
Extinct.....		4	16	20
Total.....	11	14	19	44

BETTER STANDARDS OF ADMISSION.

Not only has there been an advancement in the standards of medical education since 1904 through the elimination of 44 weaker colleges, but on the other hand there has been a decided advancement in the standards of admission. Until 1904 only 3, or 1.9 per cent of all medical colleges, were requiring for admission more than a high-school education, but since 1904 the number has increased until now 41, or 31.8 per cent (nearly one-third) of all colleges, are requiring for admission one or more years of collegiate work in addition to the high-school course, and medical teaching

¹ This statement doubtless has particular reference to a report and a chart showing the standards of "Preliminary and medical education abroad," published first in 1907.

as a whole has been placed more largely on a university basis. Another fact, however, brought out in chart 4 is that, although only about 14 per cent of the colleges held to higher admission requirements during the session of 1909-10, those colleges enrolled about 20 per cent of all students. Judging from reports received, the higher grade colleges enrolled about 35 per cent of all medical students at the beginning of the present session.

Other improvements.

In the last 7 years, however, other radical improvements in medical education have taken place. College terms have been lengthened, new methods of teaching have been adopted, more salaried teachers have been employed, more endowments secured, new buildings erected, better laboratories and laboratory equipment installed, and better hospital connections and clinical facilities secured. The last year particularly has witnessed many remarkable changes for the better in medical education. Several of our larger medical schools have received large donations, have been thoroughly reorganized, have secured or built teaching hospitals, and have adopted higher standards of admission; and reports of other changes of similar importance continue to come in.

BETTER STANDARDS OF LICENSURE.

The progress for higher standards, however, has not all been confined to the medical colleges. The requirements of State medical licensing boards have likewise been considerably advanced. The statement regarding these changes is based on a careful study of the practice acts and board rulings and on correspondence received from the officers of the various boards, giving their interpretation of the laws they have been appointed to enforce.

1. In 1904 apparently only 20 States had any provision in their medical practice acts for preliminary education; now 36 have that provision. Then only 10 States required a standard 4-year high-school education as their minimum standard, and none required any college work; now 30 States require the standard high-school course, and 8 of these require 1 or 2 years of collegiate work in addition. Then only 4 States conducted preliminary examinations and inspected credentials previous to or at the time of matriculation; now 8 States perform those duties.

2. In 1904, 36 States required that all candidates for license be graduates of legally chartered medical colleges; now 44 States have the requirement.

3. In 1904, 45 States required an examination of every applicant; now 48 require an examination of all excepting those already holding a license granted by some other State.

4. In 1904 the boards of only 14 States had authority to refuse recognition to inferior or disreputable medical colleges; now 28 boards have full authority to refuse such recognition and 14 others have a limited or divided authority.

5. In 1904, there were 36 States each having a single board of medical examiners. Since that year 3 more States have secured single boards, making 39 at the present time.

6. Reciprocal relations had been established by 27 States in 1904 with 2 or more other States; now 34 States have such relations, and in 4 other States—Alabama, Oklahoma, South Dakota, and Pennsylvania—the boards have the authority to establish such relations if they care to do so.

7. Since 1904, 6 State boards have initiated practical tests to a certain extent at their examinations, thus making it possible to differentiate between applicants who have gone through a mere cramming process and those who have had a thorough medical training in laboratory and clinic.

Advance in State licensing requirements in seven years.¹

Requirement or provision.	States in which the provisions were in force—			States having no such provision in 1911.
	In April, 1904.	In March, 1911.	Increase.	
Some requirement of preliminary education.....	20	36	16	13
A standard 4-year high-school education.....	10	30	20	19
One or two years of college work as a minimum.....		8	8	41
Inspection of all credentials at time of matriculation and control of preliminary examinations.....	4	8	4	² 30
That all applicants be graduates of a medical college.....	36	44	8	5
That all applicants undergo an examination for license.....	45	48	3	1
Requirement of practical tests in the license examinations.....	1	6	5	43
Full authority by board to refuse recognition to low-grade colleges.....	14	28	14	21
Reciprocal relations with other States.....	27	36	9	13
Single boards of medical examiners.....	36	39	3	10

¹ Educ. number Amer. Med. Assoc. Bull., Jan. 15, 1911, pp. 72-78.² Eleven States have no medical colleges, and therefore no need for this provision.

It is noteworthy that not only a national, but an international or world standard of medicine is portended, attention to which is drawn by Dr. Eijkman, of The Hague, and is indicated by the chart of preliminary and medical education at home and abroad.

Mr. Abraham Flexner's report on medical education in the United States and Canada, Bulletin No. 4, of the Carnegie Foundation, resulted in a popular agitation of the subject of standards for medical colleges, and brought up the influence of the Foundation to reenforce the standards established by the Council on Medical Education.

The American Medical Association ideal standard of medical education is as follows:

The ideal standard to be aimed at from the present viewpoint should consist of: (A) Preliminary education sufficient to enable the candidate to enter our recognized universities, such qualifications to be passed upon by the State authorities. (B) A course of at least one year to be devoted to physics, chemistry, and biology, such arrangement to be made that this year could be taken either in a college of liberal arts or in the medical school. (C) Four years in pure medical work, the first two of which should be largely spent in laboratories of anatomy, physiology, pathology, pharmacology, etc., and the last two in close contact with patients in dispensaries and hospitals in the study of medicine, surgery, obstetrics, and the specialties. (D) A sixth year as an interne in a hospital or dispensary should then complete the medical course.

Under such a scheme the majority of men would begin the study of medicine between 18 and 19 years of age, and would graduate from the hospital internship at from 24 to 25. A college education is recognized as a desirable preparation for a limited number of men, but it is thought that it is not and never will be desirable to make such college education a requirement to the study of medicine, as it would make the age of graduation from 27 to 28 years, which is regarded as too old a period at which the young medical man should begin his life's work. It is obvious that this very desirable scheme of requirements can not be at once demanded or recommended.

As a result of the second tour of inspection of the medical colleges, in view of the conditions actually existing, and with a view to the

immediate needs of medical education, the council reported the following outline of the essentials of an acceptable medical college:

Omitting from consideration a number of the utterly worthless medical colleges, this outline represents in the majority of points a line considerably below the average of conditions existing in all the colleges of the United States and Canada. The outline is as follows:

1. Strict enforcement of all standards and requirements, the college itself to be held responsible for any instances where they are not enforced.

2. A requirement for admission of at least a 4-year high-school education, superimposed on 8 years of grammar-school work, or the actual equivalent education, this to consist of 14 units, as defined by the College Entrance Examining Board and required by the Carnegie Foundation for the Advancement of Teaching.

3. As soon as conditions warrant, the minimum requirement for admission should be enlarged to include at least one year's college work each in physics, chemistry, and biology, and a reading knowledge of at least one modern language, preferably German or French.

4. A requirement that students be in actual attendance in the college within the first week of each annual session and thereafter.

5. That actual attendance at classes be insisted on except for good cause, such as for sickness, and that no credit be given under any circumstances for less than 80 per cent of attendance on each course.

6. That advanced standing be granted only to students of other acceptable colleges, and that in granting advanced standing there shall be no discrimination against the college's full-course students.

7. Careful and intelligent supervision of the entire school by a dean or other executive officer who holds, and has sufficient authority to carry out, fair ideals of medical education as interpreted by modern demands.

8. A good system of records showing conveniently the credentials, attendance, grades, and accounts of the students.

9. A fully graded course covering 4 years of at least 30 weeks each, exclusive of holidays, and at least 30 hours per week of actual work; this course should be clearly set forth in a carefully prepared and printed schedule of lectures and classes.

10. Two years of work, consisting largely of laboratory work in thoroughly equipped laboratories in anatomy, histology, embryology, physiology, chemistry (inorganic, organic, and physiologic), bacteriology, pathology, pharmacology, therapeutics, and clinical diagnosis.

11. Two years of clinical work, largely in hospitals and dispensaries, with thorough courses in internal medicine (including physical diagnosis, pediatrics, nervous and mental diseases), surgery (including surgical anatomy and operative surgery on the cadaver), obstetrics, gynecology, laryngology, rhinology, ophthalmology, otology, dermatology, hygiene, and medical jurisprudence.

12. At least 6 expert, thoroughly trained instructors in the laboratory branches, salaried so they may devote their entire time to instruction and to that research without which they can not well keep up with the rapid progress being made in their subjects. These instructors should rank sufficiently high to have some voice in the conduct of the college. There should also be a sufficient number of assistants in each department to look after the less important details.

13. The medical teaching should be of at least the same degree of excellence as obtains in our recognized liberal arts colleges and technical schools.

14. The members of the faculty, with a few allowable exceptions, should be graduates of institutions recognized as medical colleges, and should have had a training in all departments of medicine. They should be appointed because of their ability as teachers and not because they happen to be on the attending staff of some hospital or for other like reasons.

15. The college should own or entirely control a hospital, in order that students may come into close and extended contact with patients under the supervision of the attending staff. The hospital should have a sufficiently large number of patients to permit the student to see and study the common varieties of surgical and medical cases as well as a fair number in each of the so-called specialties.

16. The college should have easily accessible hospital facilities of not less than 200 patients, which can be utilized for clinical teaching (for senior classes of 100 students or less), these patients to represent in fair proportion all departments of medicine.

17. The college should have additional hospital facilities for children's diseases, contagious diseases, and nervous and mental diseases.

18. Facilities for at least 5 maternity cases for each senior student, who should have actual charge of these cases under the supervision of the attending physician.

19. Facilities for at least 30 autopsies during each college session (for senior classes of 100 students or less).

20. A dispensary, or out-patient department, under the control of the college, the attendance to be a daily average of 60 cases (for senior classes of 100 students or less), the patients to be carefully classified, good histories and records of the patients to be kept, and the material to be well used.

21. The college should have a working medical library to include the more modern text and reference books and 10 or more leading medical periodicals; the library room to be easily accessible to students during all or the greater part of the day, to have suitable tables and chairs, and to have an attendant in charge.

22. A working medical museum, having its various anatomic, embryologic, pathologic, and other specimens carefully prepared, labeled, and indexed, so that any specimen may be easily found and employed for teaching purposes.

23. A supply of such useful auxiliary apparatus as a stereopticon, a reflectoscope, carefully prepared charts, embryologic or other models, manikins, dummies for use in bandaging, a Roentgen ray or other apparatus now so generally used in medical teaching.

24. The college should show evidences of reasonably modern methods in all departments and evidences that the equipment and facilities are being intelligently used in the training of medical students.

25. A statement in which the college's requirements for admission, tuition, time of attendance on the classes, sessions, and graduation are clearly set forth should be given, together with complete lists of its matriculants and latest graduating class in regular annual catalogues or announcements.

DEFINITIONS OF A MEDICAL COLLEGE¹ AND A MEDICAL SCHOOL.²

"An institution to be ranked as a medical college must have at least 6 professors, giving their entire time to medical work, a graded course of 4 full years of college grade in medicine, and must require for admission not less than the usual 4 years of academic or high-school preparation, or its equivalent, in addition to the preacademic or grammar-school studies."

By a medical school as differentiated from a medical college is meant a part of a university requiring for admission the equivalent of 2 years' collegiate work and which offers instruction of not less than 2 years' duration, leading to the degree of doctor of medicine.

Taking the above outline as a standard, although as already stated it represents in most particulars a very low average of the conditions actually existing, the colleges were rated on a civil-service basis on the scale of 100. The data relating to each college

¹ This definition of a college is based on that given in the revised ordinances of the State of New York, and which also was adopted by the Carnegie Foundation for the Advancement of Teaching as their standard.

² Based on the definition of the term "school" adopted in 1909 by the Association of American Universities.

were grouped under 10 general heads in such manner that the groups would have as nearly equal weight as possible, each group allowing a possible 100 points (10 per cent), and the 10 groups aggregating, therefore, a possible 1,000 points (100 per cent). The 10 heads under which the data were arranged are as follows:

1. Showing of graduates before State boards.
2. Requirements and enforcement of satisfactory preliminary education and the granting of advanced standing.
3. Character of curriculum.
4. Medical school buildings.
5. Laboratory facilities and instruction.
6. Dispensary facilities and instruction.
7. Hospital facilities and instruction.
8. Faculty, number of trained teachers, all time instructors, especially of the laboratory branches and extent of research work.
9. Extent to which the school is conducted for properly teaching the science of medicine rather than for the profit of the faculty, directly or indirectly.
10. Libraries, museums, charts, etc.

Those colleges receiving a rating of 70 per cent or above are listed in class A, those receiving a rating of from 50 to 70 per cent in class B, and those rated below 50 per cent in class C. Class A colleges may be considered, therefore, as acceptable colleges, those of class B as colleges which require certain definite improvements to make them acceptable, and those of class C as colleges in which complete reorganization would be required to make them acceptable.

THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES.

The requirements for admission to and graduation from colleges holding membership are as follows:

Preliminary education—(a) A bachelor's degree from an approved college or university. (b) A diploma from an accredited high school, normal school, or academy requiring for admission evidence of the completion of an 8-year course in primary and intermediate grades, and for graduation not less than 4 years of study embracing not less than 2 years (4 points) of Latin, 2 years (4 points) of mathematics, 2 years (4 points) of English, 1 year (2 points) of history, 1 year (2 points) of physics, and 6 years (12 points) of further credit in language, literature, history, or science. (c) An examination in the following branches, totaling 30 points: A. Required (16 points)—Mathematics (4 points), English (4 points), history (2 points), Latin (4 points), Physics (2 points). B. Elective (14 points): English language and literature, 4 points; language, German, French, Spanish, or Greek, in each not less than 2 points; solid geometry and trigonometry ($\frac{1}{2}$ year each), 2 points; biology (1 year) or botany and zoology ($\frac{1}{2}$ year each), 2 points; chemistry (1 year), 2 points; physical geography and geology ($\frac{1}{2}$ year each), 1 point; physiology and hygiene ($\frac{1}{2}$ year each), 1 point; astronomy ($\frac{1}{2}$ year), 1 point; drawing ($\frac{1}{2}$ year), 1 point. One point in any subject in a high-school or academic course demands not less than 5 periods per week of 45 minutes each for 18 weeks. (d) Certificates from reputable instructors recognized by any State board of medical examiners duly authorized by law, or by the superintendents of public instruction in States having no board of examination, may be accepted in lieu of any part of this examination. (e) This examination must be conducted by or under the authority of the board of examiners or of the superintendent of public instruction of the city or State in which the college is located as provided for in subsection (d). In no case shall it be conducted by any person connected with the faculty, medical or otherwise, of the institution to which the student is seeking admission.

A student may be allowed to enter on his medical work conditioned in not more than 6 points, and these conditions must be removed by satisfactory examination before he is allowed to enter on the second year of his medical course.

Advanced standing.—Colleges in membership in this association may honor the official credentials presented by students from other colleges having the standard requirements maintained by members of this association, excepting for the fourth year of their course, but no member shall admit a student to advanced standing without first communicating with the college from which such student desires to withdraw, and receiving from the dean of such college a direct written communication certifying to the applicant's professional and moral qualifications and to the exact work he had done in said college.

The entire course of 4 years in the college of medicine shall consist of at least 4,000 hours for each student, and shall be grouped in divisions and subdivided into subjects, each division and subject to be allotted the number of hours as shown in the following schedule:

Division 1.—Anatomy, 720 hours (18 per cent). Division 2.—Physiology and chemistry, 600 hours (15 per cent). Division 3.—Pathology, bacteriology, and hygiene, 450 hours (11.25 per cent). Division 4.—Pharmacology, materia medica, and therapeutics, 240 hours (6 per cent). Division 5.—Medicine and medical specialties, 970 hours (24.25 per cent). Division 6.—Surgery and surgical specialties, 720 hours (18 per cent). Division 7.—Obstetrics and gynecology, 300 hours (7.5 per cent).

Colleges may reduce the number of hours in any subject not more than 20 per cent, provided that the total number of hours in a division is not reduced. Where the teaching conditions in a college are best subserved, the subject may be, for teaching purposes, transferred from one division to another. When didactic and laboratory hours are specified in any subject, laboratory hours may be substituted for didactic hours.

Medical education.—Candidates for the degree of doctor of medicine shall have attended 4 courses of study in 4 calendar years, each annual course to have been of not less than 30 teaching weeks' duration, and at least 10 months shall intervene between the beginning of any course and the beginning of the preceding course. No time credit shall be given to holders of a bachelor's degree, but subject credit may be given on satisfactory examination. Four years of residence in a medical college shall be required of all candidates for the degree of doctor of medicine.

The entire course of 4 years shall consist of at least 4,000 hours, divided into the subjects as shown, and no college shall be recognized that falls below this standard over 20 per cent in any one branch or over 10 per cent in the total. Laboratory or clinic hours may be substituted for didactic hours.

Each student shall be obliged to attend 80 per cent of the exercises in every annual course of study for which he seeks credit. No student shall be given credit on examination unless he attains a grade of at least 70 per cent or its equivalent in any other marking system. And no student shall be graduated unless he shall have attained a passing grade in each and all subjects of the required curriculum.

A college which gives less than a 4 years' course of study, but does not graduate students, and is possessed of other required qualifications, may be admitted to membership.

Each medical college in membership in the association shall print in every annual catalogue or announcement a table of the total number of hours' work given in said college, arranged both by subjects and years.¹

A statement of the entrance requirements and of the didactic and laboratory portions of the medical course at colleges requiring preparatory studies beyond the high-school course equivalent to one or more years at college, prepared by Dr. N. P. Colwell, is here given:²

¹ Med. Educ. in United States. Statistics for college session of 1908-9, Aug. 14, 1909, pp. 544, 545, 549, 552, and amendment to the constitution of the association adopted in 1911.

² Bull. Amer. Acad. of Med., June, 1909.

Hours in the fundamental medical branches.

Colleges.	General anatomy.			Histology.			Embryology.			Organic chemistry.			Physiological chemistry.			Physiology.			Pharmacology.			Bacteriology.			Pathology.		
	Didactic.	Laboratory.	Total.	Didactic.	Laboratory.	Total.	Didactic.	Laboratory.	Total.	Didactic.	Laboratory.	Total.	Didactic.	Laboratory.	Total.	Didactic.	Laboratory.	Total.	Didactic.	Laboratory.	Total.	Didactic.	Laboratory.	Total.	Didactic.	Laboratory.	Total.
Johns Hopkins ¹	223	204	427	700	100	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108
Harvard.....	168	424	592	36	80	116	40	120	160	176	16	96	112	176	16	96	112	176	16	96	112	176	16	96	112	176	16
Western Reserve.....	96	480	576	36	72	108	36	72	108	36	72	108	36	72	108	36	72	108	36	72	108	36	72	108	36	72	108
Rush Medical College.....	32	604	636	112	336	448	32	96	128	32	96	128	32	96	128	32	96	128	32	96	128	32	96	128	32	96	128
University of California.....	64	590	654	32	240	272	16	80	96	64	80	144	32	80	112	48	120	168	32	80	112	48	120	168	32	80	112
University of Missouri.....	207	486	693	162	162	324	162	162	324	58	315	373	56	160	216	250	398	648	171	180	351	66	198	264	104	292	456
University of Minnesota.....	192	750	942	32	160	192	32	160	192	64	64	128	32	128	160	192	144	336	32	96	128	64	128	192	64	192	256
University of North Dakota.....	32	352	384	32	112	144	32	64	96	48	96	144	20	148	168	110	72	182	64	48	112	64	192	256	96	160	256
University of Wisconsin.....	80	554	634	32	180	212	24	108	132	64	96	160	80	128	208	144	128	272	64	96	160	80	96	176	80	192	272
Northwestern University.....	236	600	836	40	128	168	24	96	120	48	96	144	48	128	176	112	176	288	64	112	176	64	128	176	126	206	332
University of Nebraska.....	165	540	705	85	180	265	15	40	55	60	61	20	84	84	84	120	120	240	60	120	180	90	90	180	90	185	245
Cornell University.....	236	256	492	80	150	230	.....	.....	.....	64	128	192	36	72	108	96	10	106	56	.....	56	48	140	188	50	144	195
Wake Forest.....	144	484	633	57	159	207	38	97	135	51	85	136	39	121	160	134	170	304	67	80	147	45	127	172	95	228	323
Average.....	144	484	633	57	159	207	38	97	135	51	85	136	39	121	160	134	170	304	67	80	147	45	127	172	95	228	323

¹ Required work only given except in anatomy, histology, and embryology, where the average amount taken is shown.² Figures include work in pharmacology, toxicology, and prescription writing.³ This subject is required for admission.⁴ Figures show required courses; other elective work offered.⁵ Figures include work in neurology.

SPECIFIC REQUIREMENTS IN THE COLLEGE YEAR OR YEARS.

As has been noted, practically all of the schools have specified or recommended that certain subjects be included in the one or more years of college work. The subjects specifically mentioned were physics, chemistry, biology, and languages. All are agreed regarding the requirement of physics, chemistry, and biology (botany or zoology); 6 require French or German, while 5 require both; 3 specify Latin as a requirement, 1 specifies English, 1 trigonometry, and 1 recommends psychology.

MINIMUM REQUIREMENT IN PHYSICS, CHEMISTRY, AND BIOLOGY.

An attempt was made to secure the exact number of hours required by each college both of the didactic and laboratory portions of physics, chemistry, and biology. In German and French the "reading knowledge" constitutes the best measurement. The results of the investigation are given as follows:

Hours of physics, chemistry, and biology.

School.	Physics.			Chemistry.			Biology.		
	Didac- tic.	Labo- ratory.	Total.	Didac- tic.	Labo- ratory.	Total.	Didac- tic.	Labo- ratory.	Total.
Johns Hopkins.....	128	96	224	-----	160	160	-----	192	192
Western Reserve.....	-----	-----	54	-----	-----	180	-----	-----	54
Rush Medical College.....	-----	-----	240	110	260	370	36	72	108
University of California.....	64	96	160	128	192	320	96	144	240
University of Missouri.....	64	80	144	64	160	224	32	160	192
University of Minnesota.....	96	64	160	128	256	384	64	128	192
University of North Dakota.....	96	64	160	88	168	256	64	320	384
University of Wisconsin.....	160	128	288	128	192	320	96	256	352
University of Nebraska.....	108	144	232	108	144	232	108	144	232
Wake Forest.....	108	72	180	108	72	180	108	72	180
Average of total.....	-----	-----	184	-----	-----	263	-----	-----	213
Average of didactics and laboratories.....	103	93	-----	96	178	-----	67	166	-----
Constructed average....	100	90	190	90	170	260	60	160	220

The figures given above represent the work required in the liberal arts college courses of the 10 colleges which made specific requirements. The majority require that additional preliminary work in physics and chemistry must have been taken in the high school.

STATE LICENSING BOARDS.

Hardly second to the universities, colleges, and the influence of the medical associations to exact standards is the importance of having a single medical licensing board, whose members are selected because of their special fitness for the work involved and apart from politics. In many States "diploma laws," by which the presentation of the diploma of a medical college admitted to practice, or by which the faculty of a State university performed the functions of an examining board, prepared the way for a new subject. South Carolina had a State examining board, but it was in Minnesota that the legislature of 1877 passed a new medical practice act, to be thereafter known as the examination law, and creative of an independent State board of medical examiners. This became a substitute for the diploma law, which made the faculty of the department of medicine of the State

university an examining board. The example of Minnesota has been followed universally. Now all States except New Mexico require an examination of all applicants for license and 36 make provision for preliminary education, 6 requiring 1 or 2 years of college work as the minimum preliminary requirement.¹

We now have in our 49 States and Territories 82 different boards of medical examiners, including the sectarian boards. It is also of great importance that in each State there should be only one portal of entry to the practice of medicine. The following point made in the council's report deserves emphasis:

We have in some States one portal for those with ample qualifications but special gateways by which ignorant and incompetent practitioners, professing to adhere to special methods of treatment, can also get in. In the majority of States, after the representatives of these cults are licensed, even with the lower standards, they are granted or allowed to have privileges of unrestricted practice. This one portal of entry, already adopted in some States, should be a fixed educational standard to which all schools professing to train medical practitioners should have to comply. Graduation from a medical college holding to that standard should be required as well as the State license examination.²

The American standard, according to the report, it is to be noted, is not an extreme ultimatum and does not encourage the requirement of 4 years of collegiate preliminary education. The practicability of a minimum entrance requirement of 2 years of work in a college of liberal arts is shown by the fact that we now have not less than 28 medical schools requiring the 2 collegiate years:

Schools requiring 2 or more years of college education; year when first required.

	Began.
Johns Hopkins University, Medical Department	1893
Harvard Medical School.....	1900
Western Reserve University, Medical Department	1901
University of Chicago, Rush Medical College.....	1904
University of California, Medical Department.....	1905
University of Minnesota, College of Medicine and Surgery.....	1907
University of North Dakota, College of Medicine.....	1907
University of Wisconsin, College of Medicine.....	1907
Cornell University, Medical College.....	1908
Wake Forest College, School of Medicine.....	1908
Leland Stanford Junior University, Department of Medicine.....	1909
Yale Medical School.....	1909
University of Kansas, School of Medicine.....	1909
University of Michigan, College of Medicine.....	1909
University of Nebraska, College of Medicine.....	1909
University of South Dakota, College of Medicine.....	1909
University of Colorado, School of Medicine.....	1910
Indiana University, School of Medicine.....	1910
State University of Iowa, College of Medicine.....	1910
State University of Iowa, College of Homeopathic Medicine.....	1910

¹ Proc. of House of Delegates, Amer. Med. Assoc., 1909, p. 16.

² Ibid., 1910, p. 14.

	Began.
University of Michigan, College of Homeopathic Medicine.....	1911
Drake University, College of Medicine.....	1910
University of Missouri, Department of Medicine.....	1910
Dartmouth Medical School.....	1910
Columbia University, College of Physicians and Surgeons.....	1910
Syracuse University, College of Medicine.....	1910
University of Pennsylvania, Medical Department.....	1910
University of Utah, Medical Department.....	1910

The 21 following medical colleges have announced at least one year of collegiate preparation:¹

Northwestern University.	College of Physicians and Surgeons, Cleveland.
Fordham University.	University of Oregon.
Hahnemann Medical College of the Pacific.	University of Texas.
Denver and Gross College of Medicine.	University of Virginia.
Howard University.	West Virginia University.
Kansas Medical College.	Marquette University.
Tulane University.	Wisconsin College of Physicians and Surgeons.
St. Louis University.	Medical School of Maine.
University Medical College, Kansas City.	Boston University.
Washington University, St. Louis.	University of Vermont.
University of Cincinnati.	

At least 6 medical colleges provide an optional fifth year: Boston University; Indiana University; Rush Medical College; St. Louis University; University of Nebraska; University and Bellevue Hospital Medical College.

One requires a fifth year, beginning with the class which entered in 1911: University of Minnesota College of Medicine.

Dr. Colwell, the diligent secretary of the Council on Medical Education, has given an outline of the points which should be taken up in the inspection of all colleges. In other words, he shows how practically the standards may be applied. To further illuminate the standards, his points are given.²

METHODS OF INVESTIGATION.

1. *The character of the college.*—Inquiry should be made to learn whether it is a stock corporation or whether a department of a university; whether its finances are controlled by the faculty or by a separate board of trustees and, if a department of a university, what control the latter has of the finances and standards. If there are departments of pharmacy and dentistry, it should be learned to what extent the students are taught together and the differences, if any, in the preliminary requirements.

2. *Finances.*—The income from students' fees, endowments, or other sources should be learned, as well as the various items of expenditure. Financial statements should be studied, if available. The number of students enrolled and the tuition fees should be noted.

3. *Faculty.*—The relation of the faculty members to the various chairs should be learned, and, when chairs are vacated for any reason, how successors are chosen. The

¹ Proc. Amer. Med. Assoc., 1910, pp. 12, 13, 14, 15.

² Med. Educ. in the U. S., 1909, pp. 513-14.

number of salaried instructors should be learned, the amount of time devoted to teaching, and the subjects handled by each. The qualifications of the faculty members is, of course, a matter of much importance.

4. *Entrance requirements.*—The entrance records should be inspected and also the original credentials handed in by the students. Special note should be made of the institutions granting the credentials and from any source possible a knowledge of these institutions obtained in order that a proper valuation of the credentials can be made. If any outside party, such as a high-school principal or the county superintendent of schools, passes on the credentials or conducts the entrance examinations for the medical college, he should be interviewed and his methods learned.

5. *Advanced standing.*—The methods of granting advanced standing from other institutions should be learned and note made of the medical schools from which credentials have been accepted.

6. *Length of course.*—The dates of beginning and ending the sessions should be obtained and inquiry made regarding holidays, time allowed for matriculation, and the requirements of attendance at classes.

7. *Character of the curriculum.*—The lecture or class schedule actually in use by the college should be studied to learn whether the course is graded, to see what subjects are being taught and by what methods—lecture, laboratory, or clinic. If clinics are mentioned it should be learned whether they are held at the college dispensary or at hospitals, and what hospitals.

8. *Buildings.*—The condition of the buildings as regards care and utility should be noted. Ample space for the accommodation of the classes and ample provision for light, heat, and ventilation are of more importance than architectural beauty. General cleanliness is important since aseptic methods can not well be taught in filthy buildings and laboratories.

9. *Laboratories.*—The number of laboratories, the subjects taught in each, the equipment and the evidences of recent active work are of much importance. This furnishes a fair idea as to whether or not the college is keeping up to date in its methods of teaching. Any evidences of original research should be noted. The inspector should examine students' notebooks, tracings, or other evidence of students' work. The presence of an all-time salaried instructor and the character of his work are usually indicated in the appearance of the laboratory and equipment. According to the subject taught in the laboratory, the following points should be noted:

(a) *Anatomy.*—The amount and character of the dissecting material should be noted and whether modern methods of embalming are used by which dissection is made more safe and pleasant than by the old methods. The use of cadavers for operative surgery and the use of frozen cross sections, or other prepared anatomic specimens, charts, or other modern adjuncts should be noted.

(b) *Physiology.*—In any laboratory which is at all equipped for teaching physiology the inspector will invariably see such apparatus as kymographs, levers, time markers, electrical apparatus, etc. The presence of animals and frogs will be additional evidence of modern methods. Students' individual work, such as notebooks, tracings, etc., will furnish a good idea of the work done.

(c) *Chemistry.*—Here cleanliness is an important consideration. The presence and character of the apparatus and reagent bottles will indicate whether the work is limited to general chemistry or whether organic and physiologic chemistry are also taught. Out-lines of the courses taught should be studied, if available.

(d) *Histology and embryology.*—The supply and character of microscopes, microtomes, bottles of blocked specimens, or cut sections will usually be seen. Any additional apparatus, such as stereopticons, charts, etc., should be noted. Evidences of active work by teacher or students are important. For embryology the same apparatus and in addition the presence of incubators, charts, models, or other adjuncts should be noted.

(e) *Bacteriology*.—An ample supply of good oil-immersion microscopes is a necessity. Note should also be made of sterilizers, incubators, test tubes, prepared media (potato, gelatin, agar-agar, etc.), and cultures. Cleanliness in this laboratory is of particular importance for the sake of the student himself as well as for the reliability of his work. The presence or use of animals and the manner of caring for them should be noted.

(f) *Pathology*.—An ample supply of microscopes is necessary, unless those used in histology or bacteriology are easily accessible. The number of gross and microscopic material should be noted. If any postmortems are being done by a careful instructor, there will usually be evidences of it in a supply of preserved gross specimens in this laboratory or in the museum.

(g) *Pharmacology, materia medica, and therapeutics*.—Note should be made of laboratories for these subjects, particularly the first, and any available outlines of work should be studied.

(h) *Clinical laboratories*.—Of great importance are the facilities for training students to make the various laboratory diagnostic tests of blood, urine, sputum, etc., and note should be made of any laboratories for the purpose and whether they are amply equipped with microscopes, reagents, stains, burettes, blood-counting outfits, etc. Small laboratories for this purpose are sometimes found in hospitals, in which case it should be learned whether the students have regular work there or whether the work is all done by the internes.

(i) *Other laboratories*.—Any advanced research, public health, or other laboratories should be noted, but particular inquiry should be made as to the part such have in the training of medical students, since that is the chief function of the medical college.

10. *Dispensary*.—It should be noted whether a suite of rooms or a single room or merely the college office is used for dispensary purposes. The sanitary condition of these rooms, the equipment, and the evidences of active work are important. If possible the visit should be made during the regular dispensary hours, that it may be seen how many patients are in attendance and what part the students have in the examination and care of these patients. The records of patients should be inspected and the average daily or weekly attendance noted.

11. *Hospitals*.—All hospitals at which the college claims to hold clinics should be visited and evidence obtained regarding the actual attendance of students. The average number of patients in the hospital and particularly the average number of free or ward cases which can be used for teaching purposes should be learned. The number of clinics per week held in each hospital should be noted and whether they appear on the lecture schedule or not. The amount and character of the work done by the students in the examination and treatment of patients is of particular importance, as well as the opportunity for training in the various departments of medicine, surgery, gynecology, obstetrics, pediatrics, etc.

12. *Maternity work*.—Special inquiry should be made regarding the number of cases required of each senior student, the extent of the student's responsibility in the handling and care of each case, the number of cases obtained and where they are obtained. Maternity wards of hospitals should be visited and the actual number of patients noted.

13. *Library*.—If the college has a medical library, note should be made of its accessibility to students and the arrangements for the students' comfort, the presence of a librarian, the number of modern and useful text and reference books and the number of useful medical periodicals. Only too often there will be found a lot of old, out-of-date volumes of no particular use to medical students. Of far more importance than the mere presence of a medical library are the evidences that it is used and useful in the training of medical students.

14. *Museum*.—It should be noted whether there is a good supply of modern useful anatomic, pathologic, surgical, obstetric, or other specimens or whether the collection consists merely of old, useless curiosities; whether the specimens are labeled; whether an index is kept, and, in connection with the pathologic specimens, whether the clini-

cal histories are systematically filed for reference. In fact, the important point, as with the medical library, is the extent to which this museum is used in medical teaching.

15. *Special features.*—Note should be made of any special features, such as freezing plants for preserving cadavers, animal houses or dog hospitals, and of any special apparatus, as reflectoscopes, Roentgen-ray outfits, charts, models, manikins, etc.

16. *Supplementary information.*—Besides the information obtained directly through the inspection, other sources should be looked to for whatever will aid in forming an accurate idea of what the college is doing. The finished product, the graduates of the colleges, should be considered. The success or the failure of its graduates at State license examinations, their success and standing among practitioners and educators, the places they secure in hospitals, public health positions and elsewhere wherein they can show the training received while in the medical college—all these facts are of much importance.

OBJECTIONS TO A RIGID STANDARD CURRICULUM.

It is too early to have a rigid and specific standard curriculum. Medical education is still in a transitional stage. As Prof. Welch points out, the recommendations of the Council on Medical Education are made to be suggestive and must not be considered obligatory in detail. The curriculum should have at least occasional elective courses, with an irreducible minimum of the fundamental branches. Sound pedagogy and experience, in my mind, confirm the opinion of Prof. Welch, that the present sharp segregation of the laboratory subjects in the first 2 years and the medical and surgical subjects in the last 2 must give way to a distribution of these courses through 4 years by some method of concentration. Welch says:

As regards the arrangement of the curriculum, the general consensus of opinion is that the so-called laboratory subjects—most inappropriately called the 'scientific' subjects, because medicine and surgery are equally as scientific—should occupy the first 2 years and the clinical courses the last 2 years. It is a question which may fairly be debated; it is still an open one, whether the student should not be brought into contact with patients at an earlier period than this, whether there should not be some sort of clinical training before this period. I think that the student should, in the second year, come into contact with patients. We are going to adjust our course, if possible, to this end, so that the student at the end of the second trimester of the second year be introduced into clinical methods, practically, through physical diagnosis. That would enable him during his long vacation to do some work in the dispensaries. It would be a very decided improvement. In France the student begins with clinical work—an old-fashioned way; he comes into contact immediately with patients.¹

OBJECTIONS TO REQUIRED COLLEGIATE PREPARATION.

The department of education of the State of New York has not seen its way clear to require more than a 4 years' high-school course for admission to medical colleges. It voices the usual objections to formulating uniform regulations for the practice of a profession throughout the United States. It urges the difference in the density of the population, due to natural conditions, with the resultant

¹ Assoc. of Amer. Med. Col., 20th annual meeting, 1910, pp. 62-68.

differences in facilities of intercommunication—which seems to be little appreciated by the advocates of national legislation looking to uniform standards. With such an experience in the United States as that afforded by New York State through the more than half a century of its experimentation in the regulation of professional practice, and with the fuller information of the same experiment in Europe available, it is surprising that speakers dream of the possibility of uniform standards for populations varying in density from Massachusetts, with 371 inhabitants to each square mile, New York with 171, Ohio with 110, Michigan with 44, and California with 11.¹ On the other hand, Johns Hopkins, followed by Harvard, Columbia, and Cornell, requires a bachelor's degree for those who would become candidates for the M. D. degree, though modifications in the case of Harvard make possible entrance with 2 years of liberal arts. It seems certain that the standard of 2 years of liberal arts will prevail.

DEGREES.

The first degree in medicine was conferred at Harvard in 1788. Before 1811 the degree conferred upon graduates of the school was that of Bachelor of Medicine. Beginning with 1811 the degree has been Doctor of Medicine. Inconsistently with the well-established American usage of bachelor's degrees in law, theology, and engineering, the M. D. degree is given universally. There are some signs that the M. D. degree may be put on a parity with the doctor's degree in other faculties, as more than 4 years may be required in the medical course, and research and success in hospital practice are emphasized. The combined courses in liberal arts and medicine have resulted in *seven years'* A. B. and M. D. degree, and a *six years'* course with a B. S. and M. D. degree, in effect making a specific if not a lower B. S. degree. The preliminary medical courses in independent literary colleges, which were constructed to gain a year of advanced credit in the colleges of medicine when the latter required 4 years in their courses and gave a year's advanced credit for a bachelor's degree, have practically disappeared. As early as 1876 preliminary medical courses were offered at Cornell. A little later Yale and in 1887 the University of Wisconsin announced a definite course in general science antecedent to the study of medicine.² Commencing about 1888 medical colleges have given credit for such work, permitting college graduates to enter the second year. In 1896 the medical practice act in New York was changed so as to preclude the granting of such advanced standing, though the statute was amended in 1903 giving the board of regents the right to permit such applicants to have certain recognition. The requirement that every appli-

¹ Rep. on Higher Educ. in the State of New York, 1910, p. 197.

² Third an. conf. of the Council on Med. Educ. A. M. A., 1907, p. 27.

cant for a license should have been 4 years in residence in a medical college was set up in a statute in Minnesota in 1898, but was not applied by the examination board of Minnesota to the recognition of a college until 1904. The medical boards in Kentucky, Michigan, Iowa, and a number of other States have put in force a similar provision.

With the adoption of the 2 years of collegiate preliminary education, the difficulty for the independent colleges has also disappeared, provided they give proper instruction in chemistry, physiology, and biology. The pressure of these colleges incidentally established the development of a fifth medical year. The University of Chicago accommodated them, and thus became one of the first to have a fifth year in operation. It was announced as follows:

Beginning with the year 1905-6, a *fifth year* was added to the curriculum which, until further announcement, is optional. The work of this year will be that of—

A. Graduate work in one of the departments of the college, either as a graduate student or as a fellow; or

B. An internship in a hospital under the following conditions: (1) Each student taking such work will be under the constant supervision of the faculty, by whom the hospital in which the internship is taken must be approved. (2) The student must present evidence of thorough clinical work, and an acceptable thesis, involving creditable original work. (3) He may be required to pass a special examination at the end of the year.

On the successful completion of this fifth year he will receive the degree of doctor of medicine, *cum laude*.

The requirement of a fifth year, to be spent as interne in an approved hospital or in laboratory studies in the medical college in preparation for teaching, was established by the University of Minnesota for all students entering in September, 1911, and thereafter. Furthermore, all students entering in September and thereafter must secure the degree of B. A. or B. S. from that university or an approved college before the M. D. will be conferred.

The opposition of these literary colleges could not overcome the demands of the licensing boards for 4 years of actual residence in the college of medicine, and the colleges of medicine did not believe that the general instruction in the scientific branches could be equivalent to that given and applied in the medical laboratories in the same subject.¹

SUMMARY.

The practical bearing upon the life and death of mankind of medical education has made the development and coordination of medical education with general education more than an academic

¹ For a discussion pro and con, see the combined course for the degree of A. B. or B. S., and M. D. John Milton Dodson, reprint from Jour. of Amer. Med. Assoc., May 22, 1909.

question, and has accelerated the movement for the solution of several educational problems. It has made clear that the detached professional school must become an integral part of a university, that commercialism, even in the subtle form of professional promotion or fame, must be displaced, and that educational institutions must be supplemented by the State in medical practice acts and expert examining boards. The advances of science and of medicine by which medicine is the application of science, including the science of psychology, to the prevention and cure of disease, have made such drafts upon the time of the student and so added to the cost of instruction that a reorganization of education outside medicine from the bottom to the top has been demanded.

As "one touch of nature makes the whole world kin," medicine, affecting universal humanity, promotes study, national and international, in medical education, and in its ramifications with general education.¹

¹ Cf. "The interest of the public in high standards of professional education," Carnegie Foundation, 3d an. rep., pp. 159-163, and "The business of law and medicine v. The profession of law and medicine," pp. 163-166, and "The college and university in relation to medical education," 5th an. rep., pp. 40-43.

CHAPTER IV.

STANDARDS OF LAW SCHOOLS.

Analogous to the early apprentice system in theology and medicine, the student of law for the first 200 years in the United States read law with some practitioner and was the office clerk. Small groups of students gathered about some distinguished lawyer, and so there appeared at Litchfield, Conn., a group and school of great distinction in its day.

The oldest of the law schools now existing in the United States is that of Harvard. In the autumn of 1815 it was determined to establish a professorship of law, in accordance with the will of Isaac Royall, Esq., dated May 26, 1773. The chair was called the Royall Professorship of Law. May 14, 1817, at a meeting of the president and fellows of Harvard College it was voted that some counselor learned in the law be elected, to be denominated "a University Professor of Law," who shall reside at Cambridge and open and keep a school for the instruction of graduates of this or any other university, and of such others as, according to the rules of admission as to attorneys, may be admitted after 5 years' study in the office of some counselor.

The degree of bachelor of laws was instituted, to be conferred upon the student after 18 months' (or 3 terms') study at the university school and the residue of the novitiate in the office of some counselor of the supreme court of the Commonwealth or who shall have studied 3 years, or if not graduate of any college 5 years, in the school.¹ Even in 1857 the Harvard catalogue admitted that no examination and no preliminary course of previous study was necessary for admission, but if the student is not a graduate of some college he must be at least 19 years of age and produce testimonials of good moral character. In 1870 the course prescribed for the degree was lengthened to 2 years, and all the subjects of each year were taught every year. The present 3 years' course dates from 1877. Special students were admitted without examination as late as 1893. In the year 1896-97 the rule came into force by which only graduates of approved colleges and persons qualified to enter the senior class of Harvard were admitted as regular students. Under the present rule, adopted in 1899, only graduates of approved colleges will be admitted as regular students.

¹ Catalogue of the Harvard Law School, 1854-55, p. 21.

For many years before and after the middle of the nineteenth century the opening sentence of the annual catalogue of Harvard read:

STANDARDS OF LAW SCHOOLS.

The design of this *Institution* [not college or school] is to afford a complete course of legal education for gentlemen intended for the bar in any of the United States except in matters of mere local law and practice, and also a systematic course of studies in commercial jurisprudence for those who intend to devote themselves exclusively to mercantile pursuits.

The catalogue of 1852-53 follows the course of instruction for the bar with a separate course as follows:

The course of instruction for the mercantile profession is more limited and embraces the principal branches only of jurisprudence; namely, the law of agency, of partnership, of bailments, of bills of exchange and promissory notes, of insurance, of shipping, navigation, and other maritime laws, of sales and, if the student desire it, of constitutional law.

It is interesting to note that we have here a germ of the university school of business, or of commerce, which appeared as a separate organization at the beginning of the twentieth century.

Yale quickly followed Harvard. The catalogue for 1824 contained a list of law students, although no announcement was made concerning the course of instruction. The catalogue for 1826 for the first time described the work of the law school, but no degrees were conferred until 1843. The length of the course from the founding of the school to 1896 was one of 2 years. It was then extended to 3 years. The graduate course was established in 1876. The Yale law school claims to have been the first law school in America or England having a course leading to the degree of doctor of civil law.

Among the original schools contemplated in Mr. Jefferson's plan for the organization of the University of Virginia was:

"Law, municipal and foreign; embracing the general principles, theory, and practice of jurisprudence, together with the theory and principles of constitutional government." Accordingly the school of law was established in 1826, and has been in continuous operation since, even during the 4 years of the Civil War. From its inception until 1894 the course comprised the work of a single year. With the session of 1894-95 a 2 years' course was inaugurated, which continued up to the session of 1909-10, when the course was extended to 3 years.

The law school of New York University was established in 1835.

In the same year (1835) the board of trustees of Indiana College selected its first professor of law, and when the college in 1838 became the Indiana University, the act of the legislature required that a course of law should be given in it. The school was opened in 1842, and it is believed to be the first State university law school established west of the Alleghenies.

The school of law of Columbia was established in 1858. The department of law of the University of Michigan was organized in 1859; of Wisconsin and Iowa in 1868. The organization of law schools was gradual; they were less numerous than the medical schools, and there was not a flood of proprietary schools as in medicine.

REQUIREMENTS FOR ADMISSION.

There were no requirements at the beginning in the best schools. As late as 1874 candidates for admission, for example in Wisconsin, were required simply to pass examinations in the ordinary English branches. Gradually the requirement of a high-school course was made, at first of a 3 years' course. Within a decade the requirement has been made that of a 4 years' high-school course or the requirements for admission to the liberal arts college of the institution. Harvard was a pathfinder in requiring a bachelor's degree for admission, but at first the requirement practically was a paper requirement, because bachelors' degrees from the numerous so-called colleges were very freely accepted. Says Bush:

In 1829 there was neither an entrance nor a final examination. The course nominally of 2 years really permitted the student to acquire no more than he could have acquired in 1 year's systematic study. This condition lasted until 1870, when radical reforms were introduced. * * * In 1877 the standard of the school was again raised by extending the course from 2 to 3 years, and in that year entrance examinations were established, the candidates examined in *Cæsar*, *Cicero*, *Virgil*, and *Blackstone's Commentaries*.

Since that time increase in the number of students who were also graduates of a college has been steady—an indication of wider recognition and of the advantages of a college education as a base for professional success.

The university in many cases was imposed upon and received men with bachelor's degrees which scarcely represented the training of a first-class high school; it then began to make a list of colleges for its own use and now defends itself from abuse by openly suggesting in the catalogue that the persons who would be admitted without examination as candidates for the degree of bachelor of laws be:

1. Graduates of college. of high grade upon producing their diplomas.
2. Graduates of other colleges of approved standing upon producing their diplomas together with an official certificate that they ranked in the first third of the class on the work of the senior year.

UNCLASSIFIED STUDENTS.

The following persons will be admitted as unclassified students:

1. Graduates of colleges who are not admissible as regular students.
2. Graduates of law schools having a 3-year course for their degree.

Persons admitted as unclassified students must, in order to receive a degree, obtain a mark within 5 per cent of that required for the honor degree.

SPECIAL STUDENTS.

Persons who have never received a degree, but who have attained the age of 21 years, will, in rare instances, be admitted as special students by special vote of the faculty.

Columbia followed the example of Harvard. In the main no reputable institution requires less than a 4-year high-school course, and the leading institutions are feeling their way toward a requirement of 2 years of collegiate preparation in addition to the high-school course. The announcement by the University of Michigan¹ of the gradual approach to the requirement of 2 years of collegiate preparation is symptomatic:

In the year 1912, and thereafter until further notice, the requirements for admission to the department will be increased by the addition to the high-school course now required of a year of university or college work. In 1912, and thereafter, candidates must present a certificate showing the completion of 1 year of university or college work in an institution approved by the faculty of the department or its equivalent. Within a reasonable time after 1912, it may be expected that a second year of university or college work will be added to the requirements for admission to the department as candidate for a degree.

Yale had clearly enunciated the 2-years' collegiate preliminary requirement, but in 1911 asked college graduation. Several of the institutions now require 1 year of liberal arts or announce 2 years with certain provisions by which persons lacking in the 2-year preparation may be admitted.

The terms of admission to the undergraduate department of common law in the Catholic University of America well state the requirements of the institutions still receiving intrants on the basis of a high-school education:

Applicants for admission to this department must have received a high-school education or its equivalent; must be of good moral character and studious habits; and must have complied with all the rules in force in the State where they expect to practice in regard to registration. Students pursuing courses for the degrees of bachelor of arts, bachelor of science, etc., in the other departments of this university may take a portion of the first year law courses in this department during their junior and senior years, and will be given credit for whatever work they may accomplish should they afterwards become candidates for the degree of bachelor of laws.

The requirement of the State of New York, established by the State education department, does not rise beyond a high-school preparation.²

The process of advancing the standards and the approximate date of the general advance is well illustrated by the history of the law school of the University of Wisconsin. From 1868 to 1874 the course of study covered but 1 year, and no requirements as to admission were exacted.

In 1874 candidates for admission were required to pass examinations in the ordinary English branches. In 1881 the course of study was extended to 2 years, and candi-

¹ Catalogue, 1910-11, p. 309.

² Handbook 27, Higher Education—Law, 26, 31, 32.

dates were required to have a fair English education. In 1894 the course was extended to 3 years. In 1896 the requirements for admission were made the same as in the college of letters and science. In 1905 candidates for degrees were required to present additional credits equivalent to the freshman year of the college of letters and science. In 1907 the present requirements of credit equivalent to the freshman and sophomore years of the college of letters and science became effective.

A general idea of the prelegal course is found in Chicago.

Various studies especially valuable in the preliminary education of a lawyer have been designated as "prelegal courses," and are enumerated below. Though not required, prospective law students are strongly advised to elect at least a year of work (chiefly in the third college year) from this group, and to choose their junior college electives with this view. Candidates for the degree of LL.B. are also urged to take prelegal work before entering the law school.

A choice among the courses offered in the university upon the following subjects is particularly recommended:

Principles of political economy; constitutional and political history of the United States; National, Federal, State, and municipal government; constitutional and political history of England; Roman law; oral debates and argumentation; book-keeping and accounting; railway transportation and regulation of rates; economic and social history; finance, money, and banking; financial and tariff history; organization of business enterprise; introduction to study of society; contemporary society in the United States; industrial groups and urban communities; charities and social treatment of crime; social forces in modern democracy; logic and psychology; political and social ethics.

With the approval of the dean of the law school other courses may also be accepted as prelegal work, especially those offered in the departments of political economy and political science courses in English, American, and modern European history, and courses dealing with modern social and municipal problems. Students who have not had the course in civil government in the United States, or who have not completed the English composition required in the junior colleges, should take these before entering the law school.

The movement toward a 2-year standard of prelegal education has become national, through the promotion of the Association of American Law Schools, whose object is the improvement of legal education in America, especially in law schools.

Its articles of association, as adopted in 1900 and amended and construed in the 10 subsequent annual meetings, outline the general progress in the standardizing of law schools, as the following excerpts will show: ¹

Law schools may be elected to membership at any meeting by vote of the association, but no law school shall be so elected unless it complies with the following requirements:

1. It shall require of all candidates for its degree at the time of their admission to the school the completion of a 4-years' high-school course, or such a course of preparation as would be accepted for admission to the State university or to the principal colleges and universities in the State where the law school is located: *Provided*, That this requirement shall not take effect until September, 1907. (As amended in 1905.)

A later resolution on the subject is as follows:

Resolved, That the association deems it highly advisable that the requirements for admission to the law schools which are members of this association shall be advanced

¹Association of American Law Schools: Articles of association adopted Aug. 23, 1900, as amended and construed in the 10 subsequent annual meetings.

as rapidly as the conditions under which the work of the several schools is carried on will permit, and strongly commends the action of those schools which have already advanced their requirements so as to require one or more years of work at college as a prerequisite to admission to the law school, and express the earnest hope that this advancement may continue until all of the members of the association shall ultimately require at least 2 years of college work as preliminary to the study of law. (See Proc., 1908, pp. 4, 5.)

2. It shall require of its candidates for any legal degree study of law during a period of at least 3 years of 30 weeks each, with an average of at least 10 hours required classroom work each week: *Provided, however*, That candidates attending night classes only shall be required to study law during a period of not less than 4 years of 30 weeks each, with an average of at least 8 hours of required classroom work each week. (As amended in 1909.)¹

3. The conferring of its degree shall be conditioned upon the attainment of a grade of scholarship ascertained by examination.

4. It shall own, or have convenient access to during all regular library hours, a library containing the reports of the State in which the school is located and of the United States Supreme Court.

Any school which shall fail to maintain the requirements provided for in Article Sixth, or such standard as may hereafter be adopted by resolution of the association, shall be excluded from the association by a vote at the general meeting, but may be reinstated at a subsequent meeting on proof that it is then bona fide fulfilling such requirements.²

CONFEDERATION OF STATE LICENSING BOARDS.

In law, as in medicine, a confederation of State licensing boards was finally formed and attention given to practice acts, and there are signs that in time the analogous bodies in law may become a standardizing influence.³

¹ This section originally read as follows:

2. The course of study leading to its degree shall cover at least 2 years of 30 weeks per year, with an average of at least 10 hours' required classroom work each week for each student: *Provided*, That after the year 1905 members of this association shall require a 3-years' course.

The following construction was placed upon this section before its amendment:

Resolved, That any school which gives a degree to a student who has studied law for less than 3 years is not complying with Article VI of the articles of the association. (Adopted, Proc., 1907, pp. 39, 47.)

Resolved, That present members of the association who have in good faith accepted a different interpretation of the requirements of Article VI shall have 2 years to comply with the interpretation now adopted. (Adopted, Proc., 1907, p. 48.)

Resolved, (1) That the question of giving credit for work done in other law schools must be left to the discretion of each member of the association.

(2) That under no circumstances should students be admitted to advanced standing on account of work done in law offices, or elsewhere than in a law school, except upon the applicant's passing rigid examinations on the subjects for which time credit is to be given.

(3) That the time credit so given for office work should not exceed 1 year.

(4) That the practice of giving advanced standing on account of office work, even when so restricted, is dangerous to the maintenance of high standards and is to be reprehended, but it is not deemed wise at the present time to adopt any regulation prohibiting the allowance of time credit of a year or less for such study in law offices and the consequent admission to advanced standing on that account. (See Proc., 1908, pp. 4-6.)

² For comparative purposes with German, French, and English standards, reference may be made to "The education of the German lawyer," by Judge Karl von Lewiuski, of Berlin, in Rep. of Amer. Bar Assoc., 1908, p. 814; Notes on early history of legal studies in England, by Justice Joseph Walton, Rep. Amer. Bar Assoc., 1899, p. 601; "The teaching of the law in France," by Sir Thomas Barclay, *ibid.*, p. 593; article on legal education in England, by Harold D. Haseltine, Cambridge University, England, Proc. Amer. Bar. Assoc., 1909. See also Sir Frederick Pollock's comments on the article, N. Y. State Dept., Rep. on Higher Educ., 1911, pp. 193-194.

³ Cf. Rules for admission to the bar in the several States and Territories of the United States, 4th edition, 1907, West Publishing Co., St. Paul; also a report of a committee on standard rules for admission to the bar. Rep. Amer. Bar Assoc., 1908, p. 775.

At this point the experience of the New York State Education Department is illuminating.

The department by maintaining the standards for an approved college and rating credentials of law candidates by the standards of these colleges in proportion to the work actually done has practically raised the standards of these colleges and universities, so that they are 2 years or 1 year in advance of the requirements exacted by the rule of the court of appeals, since they require as a condition of graduation at least 6 full years in liberal arts and sciences in addition to a completed 8-year elementary course. The department declares this is not simply an academic question and queries—

whether the remarkable growth in students in attendance on the law schools during the last decade does not seem to prove that it is now time for New York State to require of all applicants for admission to the bar examinations attendance on, and graduation from, the 3-years' course in a law school registered by the regents as meeting the standard school year and class work required by the rules of the court of appeals.

* * * Three years' attendance on and graduation from a law school should be required for admission to the bar examination. Discussions by the law associations, both national and State, strengthen this belief. * * * In fairness to the profession, in the protection of the public and in justice to immature minds contemplating law as a profession, should not a prerequisite law or rule be adopted requiring not only a general preliminary education for admission to the bar examinations, but a professional training in a standard law school as well? And accompanying such prerequisite professional requirement should not the duty be imposed upon the law schools to admit only qualified students? Such laws have proved their efficiency in other professions, and certainly the profession of law is worthy of every safeguard that can be thrown about it.¹

The following are specimens of regulations concerning combined academic and law course at Yale University:

Students in the academic department of Yale University may so combine their work in that department with the work of the law school as to obtain the degree in arts and in law in 6 years. Students in the academical department may elect 8 hours of classroom work in the law school and obtain a credit for the same on the 60 hours required for the degree in arts and on the 45 hours required for the degree in law. Students who obtain this credit while in the academical department are enabled to complete the law school course in 2 additional years.

The course in mining law is open to students in the Sheffield Scientific School who are studying engineering and who present to the dean of the law school the written consent of the director of the scientific school to their registration for the course.²

The establishment of combined courses within universities has led in the interest of detached colleges to the establishment of prelegal courses by which advanced credit is given. Yale provides that:

Graduates of approved colleges who have taken while in college strictly legal studies and have passed a creditable examination in such studies at such college may, so far as such studies form part of the regular first-year curriculum, substitute for them certain courses of the second-year curriculum; and in such case, during their second year may take some of the courses offered in the third-year curriculum.

¹ Rep. on Higher Educ. in State of N. Y., for school year ending July 31, 1910, pp. 194-196.

² General catalogue Yale University, 1911-12, 574.

The combined course at Michigan is stated as follows:

Students desiring to obtain the degrees of bachelor of arts in the department of literature, science, and the arts, and of bachelor of laws, in the department of law, may by enrolling on the combined literary and law course, shorten from 7 years to 6 the time required to earn the two degrees. This privilege is open only to students who during their first 3 years have maintained a uniform record of good scholarship. The work is under the direction of a joint committee of five members, representing the department of literature, science, and the arts, and the department of law. With the consent of a committee in charge a candidate for the degree of bachelor of arts, who has been a student in the department of literature, science, and the arts for at least 1 year and has 90 or more hours to his credit, of which at least 30 hours have been earned in the department of literature, science, and the arts of this university may enroll on the combined course; that is, while continuing his registration in this department he may also register in the department of law, provided the work he has already completed includes a sufficient number of the courses to enable him to complete within 1 year the specific requirement described in the following paragraph.¹

REQUIREMENTS FOR GRADUATION.

The length of time generally given to the law curriculum, as has been shown, has risen from 1 to 2 to 3 years. The length of the year has been established practically as 36 weeks. The number of hours per week has been generally 10, with a maximum of 14. A number of the leading schools now offer a fourth year for graduate work or a degree with distinction, or an advanced degree. The curriculum has been graded. The courses have been prescribed, for the most part, through the 3 years; but with the entrance of electives, quite generally in the third year and in some cases in the second, when an institution announces that the courses are elective, it will be found that they safeguard by requiring the candidates for degrees to take a minimum amount of the standard subjects. Sometimes an institution offers an election among the prescribed curricula leading to advanced degrees, thus practically giving us a group system. An illustration of accomplishing the elective system by the route of departments is afforded by the Catholic University of America, which has 5 departments, as follows: (I) General university law lectures; (II) the undergraduate department of common law; (III) the graduate department of common law; (IV) the department of civil law; (V) the department of jurisprudence.

The combined courses with the college of liberal arts, or what amounts to the same in the permission to take under certain conditions courses in other colleges, promises very properly a development of an interrelating of law schools with departments or schools of political and social science, of commerce, and of business administration. Such schools will become more than schools preparing practitioners and will aid to reestablish, in the broad sense, jurispru-

¹ Univ. of Mich. Calendar, 1911-12, 234-235.

dence in its place of influence in general education and to retain the rank of the law faculty, as in the German universities, with the philosophical, theological, and medical faculties.

THE METHODS OF INSTRUCTION.

The methods of instruction have been as much revolutionized as in the much-heralded revolution of scientific instruction in liberal arts colleges. The original method was the lecture system, succeeded by the textbook system, succeeded by the case system, perhaps more properly named "source" method.

LAW COURSES FOR BACHELOR'S DEGREE.

Harvard.—Candidates for degree: All of first-year course amounting to 13 hours per week for the year. In 2d year 16 hours are offered, of which 12 must be taken; 18 hours offered in 3d year, of which 10 must be taken. No student may take more than 6 full courses (of 3 hours each) without special permission, and a course taken to remove conditions will be counted as part of the 6.

Advanced degree: A fourth-year course of 8½ hours is offered for advanced students, who may take any subject in 2d and 3d years not already taken, but candidates for the doctorate must take Roman law and the principles of the civil law. Graduates of other schools qualified to be members of the Association of American Law Schools may take this degree upon one year's residence after receiving the bachelor's degree.

Yale.—Candidates for degree: All required subjects of first two years, or 7 hours of required and 8 hours elective in 3d year (1st year equals about 15 hours, 2d equals about 18 hours); same amount of work required for bachelor of law and bachelor of civil law degree; but applicants for latter degree must take Roman law and may elect certain courses in political science.

Advanced degree: Those may be admitted as candidates for doctor of law (Jur. Dr.) who have arts degree from recognized institution and have graduated from recognized law school. If such persons also have the bachelor of laws degree, they may be admitted as candidates for D. C. L., but must pass examination on Roman law, Latin, and either French or German.

Columbia.—Candidates for degree: Required work consists of "74 points" and covers 3 years. Each point represents satisfactory completion of work, representing one hour per week for a half year. No student may take more than 14 nor less than 12 points per semester without special permission. All work of 1st year prescribed; all of 2d and 3d elective; 2d-year work may be taken in 3d year, but not as a rule vice versa.

Advanced degree: Master of laws degree requires 52 hours in public and private law; 18 hours must be in public law, general jurisprudence, and Roman law. Holders of the LL. B. of Columbia "or of a legal degree accepted as equivalent thereto" can usually qualify with one additional year.

Cornell.—Candidates for degree: Two courses offered—one of 9 months for 4 years and one of 9 months for 3 years. The 4-year course "is designed principally for those students who have only the preparation afforded by the high schools or preparatory schools." Torts is the only law subject taught in the course the first year; the remainder of the year is taken up with courses in the college of arts and sciences. The 3-year course is primarily designed for college graduates and for those who have completed at least a year of college work.

Chicago.—Candidates for degree: Three-year course; work of 1st year required; 2d and 3d years elective and may be taken in any order, except that certain courses are better taken in the 3d year. Practice courses required.

Catholic.—Candidates for degree: Bachelor's degree is given after a course of 3 years. The 1st-year course consists of 13½ hours; the 2d and 3d years of 13 hours each.

Advanced degree: The master's degree in law is given after a course of 4 years. The degrees of J. C. D. (Juris Communis Doctor and Juris Civilis Doctor) are conferred on students who pursue the "courses required" under direction of the faculty, pass the examinations, and present and print a dissertation. Students who do not complete the course for the doctorate may, after 3 years' study, apply for the licentiate degree. The J. U. D. (Juris Utriusque Doctor) is granted to those who fulfill conditions for both J. C. D. degrees. The LL. D. is given for 2 years of "research work within the domain of comparative jurisprudence"; open only to holders of the J. U. D. degree of this or of some other university with courses "substantially identical." Dissertation must be presented and published.

DEGREES.

The ordinary degree is that of bachelor of laws, calling for the fulfillment of the admission requirement, according to the institution, a minimum of high-school preparation, a maximum of college graduation. A 3 years' course must be completed, ordinarily in residence at the school, though certain schools permit time in an office to count for 1 year. Term and final examinations at the end of the 3 years must be passed. There is a marked tendency to reserve the degree of LL.B. for a lower standard, for example, for those who have not a liberal arts bachelor's degree, or have not had the highest quality of work. The University of Chicago, after consultation with other graduate law schools, has offered the degree of *Juris Doctor (J. D.)* which is reserved for those who are college graduates and have completed the professional course. The curriculum of the undergraduate department of common law leads to the degree of bachelor of laws (LL.B.), the curriculum of the graduate department of common law to the degrees of master of laws (LL.M.) and Doctor of Law or Juris Doctor (J. D.)

ADMISSION FOR LAW DEGREES.

Harvard (1911-12).—Graduates of colleges of high grade; graduates of other colleges when producing certificate that they ranked in the first third of the class in senior year.¹

Yale.—Graduates from an approved college or scientific school; those who can present certificate from an "approved college or scientific school" that they have done the equivalent of two full years' work of 15 hours each; prescribed examinations.

Catholic.—Must be members of the bar, or have received bachelor's degree in arts, letters, science, philosophy, theology, medicine, or law, or "must have enjoyed a literary or professional experience" which is "fairly equivalent;" must have reading knowledge of Latin, French, and German, and be "already well grounded in the principles of fundamental philosophy" or so ground themselves.

¹ Admission is granted to those not candidates for a degree who are graduates of colleges but are not admissible as regular students; graduates of law schools having 3-year course. Persons 21 years old who have no degrees may be admitted as special students by vote of the faculty and after passing examination in law, Latin, and French.

CHAPTER V.

STANDARDS OF SCHOOLS OF ENGINEERING.

What is now known as the Rensselaer Polytechnic Institute, at Troy, N. Y., founded in 1824, was the first organized technical school in the United States, though previous to its organization some technical work had been carried incidentally by professors of science in liberal arts colleges. Indeed, the latter practice prevailed until as late as 1905 in the State University of Iowa and is still found in some colleges, e. g., Cornell College. In Michigan, though work was begun in 1858 and first degrees were conferred in 1868, the engineering course was included in the curriculum of the collegiate department until 1894-95. A sketch of the enlargement of the work at the Rensselaer Polytechnic indicates well the general advance in the standards of technical work. The founder, Stephen Van Rensselaer, stated its purpose to be "the application of science to the common purposes of life." At the beginning, the institution was modestly called the Rensselaer School. The board of trustees announced that the school was prepared to give instruction in—

chemistry, experimental philosophy, and natural history with their application to agriculture, domestic economy, and the arts; and also for teaching land surveying. There were two professors, Amos Eaton, professor of chemistry and natural philosophy and lecturer on geology, land surveying, etc., and Lewis C. Beck, professor of botany, mineralogy and zoology. There were 25 students. The degree of bachelor of arts was given after one year and master of arts at the end of a second year of study. Much attention was given to field and laboratory work; in fact a circular issued in 1826 stated that the school was "limited to an experimental course in natural science," and it was confined principally to botany, geology, and mineralogy.

After 9 years, in 1833, the name was changed to "Rensselaer Institute." With this higher sounding name came an effort toward higher education, and in 1835 there was established "a department of mathematical arts, for the purpose of giving instruction in engineering and technology." At that time the degree of civil engineer (C. E.) was established and was given to 8 graduates in the department of mathematical arts, 11 years after the founding of the school. The course of study still covered only 40 weeks of 1 year, and there were only 3 professors and 1 assistant. A circular issued in 1835 said: "One year is sufficient for obtaining the Rensselaer degree of civil engineer, for a candidate who is well prepared to enter. Graduates of colleges may succeed by close application during the 24 weeks in the summer term."

Of the 40 weeks required by this course, the mornings of 4 weeks were devoted to "extemporaneous speaking on the subjects of logic, rhetoric, geology, geography, and history," and the afternoons to composition, exercises in various mathematical arts, and national and municipal law.

After another period of 11 years, another epoch and a long step forward was made, when B. Franklin Greene became senior professor in 1846. After a careful study of

the scientific and technical institutions in Europe, Prof. Greene thoroughly reorganized this institution upon the basis of a general *polytechnic* institute, and it was then called the Rensselaer Polytechnic Institute. The managers resolved that "their field should be narrowed and more thoroughly cultivated," and their efforts "restricted to matters immediately cognate to architecture and engineering." The somewhat irregular and optional course requiring but a single year, was then superseded by a systematic and thorough curriculum requiring at least 3 years * * *. The new curriculum showed the effect of the study of the French schools. Its course considerably resembled the 3 years' course of L'École Centrale des Arts et Manufactures, while the part forming the ground work of the higher technical studies resembled the curriculum of L'École Polytechnique. By the year 1854 the courses in civil engineering and natural science had been well developed. In 1857 the course in topographical engineering was added, but it was abandoned in 1866, only 5 men having taken the degree of T. E. In 1858 the 4-year course was established in civil engineering. In 1862 the course in mechanical engineering was added to those in civil and topographical engineering and natural science and all four courses were extended to 4 years, the first 2 years being the same in all. The course in mechanical engineering did not, however, materialize, and students who wished to pursue their studies in mechanical engineering were obliged to go abroad, there being no established schools in this country at that time teaching that branch of engineering. In 1871 there remained only the course in civil engineering to represent the *general polytechnic school* which was the dream of Prof. B. Franklin Greene. While the institute in 1871 ceased to be a *polytechnic* institute except in name, it was still an excellent school of civil engineering, and has grown in excellence and importance as a school of civil engineering from that day to this.¹

The rapid development of the sciences brought about at the middle of the nineteenth century after much discussion the establishment of scientific schools or courses in connection with classical institutions. The pathfinder was the school now known as the Sheffield Scientific School, commenced at Yale with a famous opening address made by Dr. Horace Bushnell in 1847. Harvard opened the Lawrence Scientific School in 1847. It was at first announced as an advanced school of science and literature for graduates and others sufficiently qualified. Most of its early students were already college graduates or persons who came for professional study of a special subject. It soon received students with only secondary school education and had courses leading to the degree of bachelor of science and the various branches of natural and applied science.

The culmination of the second stage is perhaps marked by the foundation of a second great detached school—the Massachusetts Institute of Technology. In the memorial prepared in 1859 and presented to the legislature in 1860 is given the ideal:

Reference is made to the expected early establishment of a comprehensive polytechnic college, furnishing a complete system of industrial education supplementary to the general training of other institutions and fitted to equip its students with every scientific and technical principle applicable to the industrial pursuits of the age.

On April 10, 1861, an act was passed by the General Court of Massachusetts to incorporate The Massachusetts Institute of Technology "for the purpose of instituting

¹ Rensselaer Polytechnic Institute Bulletin, Vol. 8, No. 2, (June, 1909), The formal opening of the Russell Sage Laboratory, pp. 22 ff.

and maintaining a society of arts, a museum of arts, and a school of industrial science, and aiding generally by suitable means the advancement, development, and practical application of science in connection with arts, agriculture, manufactures, and commerce."

The scope of this school was and ever has been very broad. Its great president, Gen. Francis A. Walker, inspired the school with a continuation of and combination of its original ideals of cultural and technical education.

The rising interest in industrial education, particularly in the West in agricultural education, resulted in attempts to found industrial and agricultural colleges in the universities. The Morrill Act of 1862, securing Federal land grants for colleges of agriculture and mechanic arts in each State and Territory, marks the third stage in the advance of technical education for the "industrial classes."

REQUIREMENTS FOR ADMISSION.

The requirements for admission to these colleges at first could not be maintained on the plane of the requirements for admission to the college of liberal arts, though gradually raised in stronger colleges to the same standard as the liberal arts college. In the Lawrence Scientific School, as in the case of the Rensselaer Polytechnic, at the beginning no strict requirements were enforced beyond the ability of the student to carry. The Harvard catalogue of 1846-47 reads:

All graduates of the university or any other colleges and all not graduates of 18 years, qualified to pursue the study, are admitted to the school.

There was provision to give a diploma. In the catalogue of 1848-49 the candidates for admission must have received a good common English education and be qualified to pursue to advantage courses to which they purpose to give attention. The certificate given on leaving school was to state the number of terms spent and the studies pursued. That it was not necessary to have high requisites for admission perhaps may be inferred from the character of the work, as reported in the catalogue of 1847-48:

A few students have already entered their names. They pass the time from 9 o'clock a. m. to 1 o'clock p. m. in the laboratory, engaged personally in manipulations and experiments of which notes are taken at the time, to be revised later, and submitted the following morning to the professor, who directs also the course of reading. In the summer term a full course of demonstrative lectures will be given by Prof. Horsford.

As the brief historical sketch given indicates, the requirements for admission rose slowly from a common-school education to the present full standards of 15 units for admission to college. Indeed, the standards as administered have been stiffer than in the colleges of liberal arts, the requirements in mathematics calling for more algebra, solid

geometry, and trigonometry. The languages were reduced to a minimum, and Greek disappeared.

The typical entrance requirements to-day are as follows:

ENTRANCE REQUIREMENTS.

Rensselaer (1910).—Must offer subjects covering 14 units when "unit" means the equivalent of 5 prepared recitations a week for a school year. When each recitation is not less than 40 minutes 10 units must be in required subjects; 4 from a given list of electives.

Columbia.—Total requirements, $14\frac{1}{2}$ units; required, $11\frac{1}{2}$; elective, 3.

Massachusetts Institute of Technology.—Must be 17 years old and have passed satisfactory examinations in algebra, plane and solid geometry, physics, elementary French and German, English and history, and must show satisfactory evidence of preparation in two of a number of electives.

Cornell.—15 units from the list of entrance subjects are required for entrance to the 4-year course, 4 being elective; for the 5th and 6th year courses 15 units are required with 5 electives.

Michigan.—15 units required (unit is defined to be 5 recitations per week for one year in one branch of study). $11\frac{1}{2}$ required; $3\frac{1}{2}$ units elective from a designated list.

REQUIREMENTS FOR GRADUATION AND DEGREES.

The courses of instruction have risen from 1 year to 4, and in connection with combined courses and graduate schools even to 6 years. The standard undergraduate course is still 4 years, though a course of 3 years is still reputable, as at Sheffield Scientific. The curriculum is absolutely prescribed, at least for the first year, and ordinarily for the first 2 years, when the courses differentiate from the old civil engineering course to meet the many modern applications of science.

The general character of the curricula in the various schools appears from the statements which follow:

Yale (Sheffield Scientific).—The work of the freshman year is introductory to all courses. At the opening of the year the class is divided into two groups:

(1) The Engineering Science Group which is preparatory to the courses in civil engineering, mechanical engineering, municipal and sanitary engineering, electrical engineering, mining engineering, mathematics, pure and applied, chemistry preparatory to metallurgy.

(2) The Natural Science Group which is preparatory to the courses in chemistry, zoology and botany, biology preparatory to medical studies, studies preparatory to the study of forestry, selected studies in language, literature, history, and the natural and social sciences.

For students electing any of the courses under group 1 there is offered during the freshman year a course including German or French; plane and solid analytical geometry; physics, recitations and experimental lectures; chemistry, recitations, lectures and laboratory; English; English composition; drawing; descriptive geometry.

For students electing any in group 2 the freshman year provides German or French; analytics and calculus; physics, recitations; physics, experimental lectures; elementary chemistry, recitations; elementary chemistry, lectures and laboratory; English; English composition; biology, lectures and laboratory; drawing.

After the freshman year the subjects are varied to meet the needs of the principal object of the course, but many subjects appear again and again as parts of the different courses. The courses named above cover 3, 4, and 5 years.

Massachusetts Institute of Technology.—This institution has a series of courses similar to those offered in the Sheffield Scientific School. They cover 4 years, but there is a general scientific course covering 3 years.

The first term of the first year is common to all courses and offers: Mathematics; plane trigonometry; inorganic chemistry with lectures, recitations and laboratory; mechanical drawing and descriptive geometry; freehand drawing; German; rhetoric and English composition; military science; physical training.

For the second term of the first year the work is divided into 5 different parts or sections to meet the particular needs of the diverging courses.

There are also offered other courses as follows: IV. Architecture, 4 years. VIII. Physics. XII. Geology and geodesy, 4 years. XIII. Naval architecture and marine engineering, 4 years. XIII A. Naval architecture. XIV. Electro-chemistry.

The institute has been selected by the United States Navy Department to give professional instruction to officers designated for the Corps of Naval Constructors. Course XIII A is in response to this commission. The first and second years of this course for naval constructors correspond respectively to the third and fourth years of Course XIII; the third year corresponds to graduate work in other departments and leads to the degree of master of science.

University of Illinois.—The typical development of courses in an institution that received its impetus from the Morrill Act may be seen in the University of Illinois. These courses may ordinarily be completed in 4 years representing 130 semester hours, where 1 semester hour is 1 class period (presupposing 2 hours work for preparation) per week for 1 semester. All courses lead to B. S.

In general the work of the freshman year is the same or nearly the same for all courses. I. Architecture. II. Architectural engineering. III. Architectural decoration. IV. Civil engineering. V. Electrical engineering. VI. Mechanical engineering. VII. Mining engineering. VIII. Municipal and sanitary engineering. IX. Railway civil engineering (this course differs from IV only in 3d and 4th years). X. Railway electrical engineering (differs from IX only in 4th year). XI. Railway mechanical engineering (differs from VI only after 1st semester of 3d year).

In 1906 Harvard was enabled, by the generous bequest of Gordon McKay for work in applied science, to transfer a part of the work of the Lawrence Scientific School to Harvard College, and a part to the newly established graduate school of applied science, thus discontinuing the scientific schools as an undergraduate division.

The graduate school of applied science provides instruction and offers professional degrees in engineering (civil, mechanical, electrical), mining, metallurgy, architecture, landscape architecture, forestry, applied physics, applied chemistry, applied zoology, and applied geology.

Membership in the school of applied science is open to men who are graduates of a college or scientific school in good standing. Other men of suitable age and attainments may also be admitted by the administrative board of the school by special vote in each case, but such admission does not carry with it admission to candidacy for a degree.

Other institutions, notably Rensselaer Polytechnic and the Universities of Michigan, Wisconsin, and Cornell, have offered advanced standing to graduates of higher institutions of learning. There is at present a marked tendency to differentiate university schools of engineering from collegiate schools, in accordance with the definition of the Association of American Universities—that is, a school requires

2 years of collegiate preparation in addition to that of the high school, and the college only requires a high-school preparation. In certain States where there are 2 tax-supported institutions, this policy is likely to ripen fast. The Iowa State Board of Education, in its report to the legislature of 1911, declared for the maintenance of a college of engineering at the College of Agriculture and Mechanic Arts, at Ames, and for an advanced school of engineering at the State University of Iowa, Iowa City.¹

The elective system has made it possible to announce a combined course in liberal arts and applied science. By suitable choice of electives, students complete both the liberal arts and engineering courses in 6 years, receiving various liberal arts degrees, in Iowa even the degree of B. A. with the degree of B. E.

The use of the degree of master in engineering courses is spreading—e. g., the degree of master of civil engineering granted by Harvard University. The earlier and wider usage is that of Yale, which for a course of 5 years gives the degree of civil engineer, etc. A provision is also made at Yale, which is not uncommon, in connection with the graduate school, to give for advanced work the degree of master of science, and even doctor of philosophy.

SUMMARY.

The experience of the recent years has dissipated earlier beliefs that the classical and technical institutions should be separate, and the notion that there was some inherent antagonism between the literary college and the technical school. Engineering, in some sense one of the younger professions now taking its place beside the so-called ancient and honorable professions, is also conscious of the need of a broad or cultural preliminary education. The assembling of literary and technical colleges and schools, with the present interrelation of studies, helps each institution to reenforce the other. The much heralded American ingenuity and invention have increased the need for thorough professional schools of applied science. The progress of science itself has created new points of application of science. The advance of standards, therefore, in technical schools has, almost unnoticed, kept pace with educational advances elsewhere.

¹ In 1912, the board is attempting the consolidation of the college and school at Ames.

CHAPTER VI.

STANDARDS OF SCHOOLS OF DENTISTRY.

There are three epochs and three types in the history of dental colleges. The first institution to which has been given the credit of recognizing dentistry as a distinct profession was the Baltimore College of Dental Surgery, founded in 1839. It is believed that the founders, Drs. Hayden and Harris, physicians, sought to have one of the medical colleges in Baltimore create chairs for systematic instruction of dental students in connection with the medical course. The medical faculties did not welcome the plan; hence the founding of the separate college of dentistry. In the 73 years since, these colleges have increased to about 55 now in operation in the United States alone.

The first type is the detached and proprietary college. The second type has been that in which dental education has been carried by a college of medicine, although the medical degree has not been given for the dental specialization. Colleges of this type have been rare, although the idea of appending dental to medical education has never been wholly dormant. Under this idea medical men upon occasion have sought to reunite the separate colleges of medicine and dentistry, making dentistry a branch of medicine, placing it on a basis with any other specialty. Especially in those countries where dentistry can only be practiced by qualified medical graduates have organizations like the stomatological societies agitated the question. The dentists of the United States hold strongly that the separation of the medical and dental professions was not the creation of a specialty in medicine, but the creation of a distinct profession which requires a separate course of instruction especially adapted for its successful practice. To them the dentist is the composite of the physician, the artist, and the artisan.¹

In 1865 the Massachusetts Dental Society urged the need of a dental school in connection with Harvard. As a result the Harvard Dental School was instituted in 1867, and this year marks an epoch in the history of dental education. Gradually thereafter, in the following succession, universities organized dental colleges: Pennsylvania, 1872; Michigan, 1875; California, 1881; Iowa, 1882; Minnesota,

¹ Cf. History of Dental Surgery, Chas. R. E. Koch, D. D. S., Nat'l Arts Pub. Co., 1909, Chicago. See also Proc. 15th annual meeting of the Institute of Dental Pedagogics, 1908, pp. 20-30; and Dental Cosmos, July 1909, pp. 888-891.

1887. These make the third or university type, in which the college is an integral part of the university and on a parity with the other schools.

At the beginning these schools had few standards, and naturally the proprietary schools, which were more numerous, were especially exposed to the temptations of commercialism. With this, also, in some measure, the university schools were tainted, for they were expected to be largely self-supporting. In consequence the financial interest has been especially powerful in preventing an advance of standards, which makes the instruction expensive and threatens, as in medicine, to close the schools that have not an endowment or the beneficent support of a university.

The first dental society of record in this country was formed in New York in 1840. It was known as the American Society of Dental Surgeons. This society required for admission that a person be 21 years of age and have a good English education. He must also have had 2 years' study and practice with some practical dentist known as such to the society. This society was dissolved in 1856. After that time several societies were organized, but had no permanent existence. In 1859 the American Dental Association, patterned after the American Medical Association, was formed.

One of the earliest and for a long time most successful influences for raising standards was the National Association of Dental Faculties. This association was organized in 1883, its object being to promote the interests of dental education. Its constitution, as adopted in 1906, admits to membership—

any regularly incorporated dental college or dental department in any medical college or university which has been in existence at least 1 scholastic year, and having the written approval and indorsement of its State board of dental examiners.

It guards itself on the professional side by the following section:¹

SEC. 10. No member shall be permitted to retain membership in this association if its dental school is conducted or managed in whole or in part by any person or persons who do not practice their profession in accordance with the well recognized and generally accepted forms, usually known as dental ethics, or if it is owned in whole or in part by men or women who are engaged in disreputable professional practices, or if any member shall have any one upon its list of trustees, any member of its faculty, any demonstrator, or any one in any other capacity, who does not practice professionally, in accordance with the principles above mentioned.

The association provided for a vigorous administration by having an executive committee, an ad interim committee, a law committee, a foreign relations committee, a school committee, and a committee on textbooks. These committees were to investigate all matters relating to the fraudulent issuance of diplomas, to ferret out irregular colleges and the granting of degrees irregularly by unrecognized colleges, to look to the enforcement of laws enacted by the United

¹ Sec. 10, Proc. Nat. Assoc. Den. Fac., 25th an. meeting, 1908, p. 96.

States and the various States in any manner relating to the dental profession or dental schools, as to matters concerning the status of foreign and American dental educational measures, to verify entrance credentials of foreigners applying for matriculation in any American dental college, to decide as to the equivalents of foreign dental educational instruction with American, to investigate the schools which are members of the association, to report upon any proposed new dental college or proposed reorganization of an old one, to prepare a list of dental schools, and to examine the books designed for reference or for the use of dental students. In short, this was a highly organized association, administering not only with reference to educational standards, but applying them to schools and individual students. It became very effective and contributed much to the raising of standards. But when the standards reached a certain height and financial interests were involved, or when the sovereignty of a State was touched, or the immemorial freedom of a university, there came danger of disruption, and in due time the expulsion or secession, particularly of the university schools.

Another standardizing agency is the National Association of Dental Examiners, established in 1882. The State boards of dental examiners, instituted under the police power of the State to protect the people, incidentally have done much to suppress the commercial spirit in dentistry and to raise the standards. One of its presidents expressed this very strongly in his address in 1905.¹ Speaking of the efforts of the association toward the educational advancement of the profession of dentistry, he said:

That it has been successful to a high degree is beyond question if you will but recall to what a low point the requisitions for becoming a dentist had sunk when this association was organized. At that time the dental colleges had grown to a considerable number and were engaged in a very profitable business, with hundreds of men with or without, mostly without, rudimentary education flocking to their doors. Preliminary requirements were unknown; matriculates were received and welcomed with their money, among them those who could neither speak nor write the English language; degrees were granted to all alike if they but had the money; 2 terms of 4 months each was all that was required to secure the degree, and in many cases 1 term of 4 months and a statement of previous study, easily made, sufficed. All this has been changed—changed by the established rules and legal power of the individual boards having memberships in this association. It has checked the colleges somewhat in their mad rush for money and students and held them up in a degree to its prescribed educational standards. It has advanced the requirements for graduation from 2 years of 4 months to 3 years of 9 months, and at St. Louis last year demanded as the minimum preliminary requirement for entrance to a dental college a diploma from a 4-year high school or its equivalent.

* The American Dental Association, formed in 1860 and merged with the Southern Dental Association in the National Dental Association, 1897, has fostered by general papers and discussion ideals of

¹ Nat. Assoc. Den. Exam., 1905, p. 4.

standards, with a tendency toward national uniformity. After the example of the American Medical Association, they have started a dental educational council, organized in 1910. If the purposes mentioned in their articles of organization are attained, the colleges of dentistry will be firmly established on a high level of efficiency.

The latest standardizing agency, proceeding from the third type of colleges, those of the university type, is the Dental Faculties Association of American Universities, organized in 1909, at Philadelphia, as the result of a preliminary meeting in Boston in 1908. Not content with contemplating the importance of standards, they look to the ultimate establishment of a national standard, according to article 2 of their constitution:

The object of the association shall be: To promote dental education; to improve the standard of preliminary education required for admission to dental schools; to establish reciprocal educational relations with its members, and ultimately to establish a national standard which may serve as the basis for a reciprocal interchange of dental licenses among the several States.

The membership of this association shall be limited to dental schools which are an integral part of State universities or of chartered universities of equal standing of the United States of America, holding membership in the Association of American Universities or accepted by the Carnegie Foundation for the Advancement of Teaching, demanding graduation from accredited high schools that require not less than 4 years of high-school work, or the equivalent amount of education for matriculation.

The secretary-treasurer shall keep a record of all matriculants in all colleges members of this association, giving name, age, address, and preliminary qualifications of each matriculant, list to be furnished by the dean of each college, together with the announcement for that year, within 60 days after the opening of the college—said list may be published as a reference in the annual proceedings. * * *

The educational committee shall review all announcements of members of this association;

Shall outline a preparatory course of study for matriculation, suggesting what subjects should be required and what subjects elective;

Shall advise as to the number of conditions allowable for matriculation;

Shall advise as to uniformity of curriculum, length of the sessions, and system of examinations, markings, and grades of scholarship;

Shall advise as to the conditions of promotion and admission to advanced standing;

Shall advise as to the standing of foreign preparatory and public schools and colleges, and foreign dental colleges;

Shall determine the comparative value of the curriculum of other dental colleges not members of this association.

The association, after considering the advisability of adopting a 4-year curriculum in place of the present 3-year curriculum in the college of dentistry, concluded at this time to recommend the extension of the graduate phase of instruction in lieu of adopting a 4-year obligatory curriculum.

REQUIREMENTS FOR ADMISSION.

In view of the above history, we may summarize the requirements for admission as follows: At the beginning, preliminary requirements

were unknown; even the *intrants* sometimes could neither speak nor write English. At Harvard an examination for admission was first required in 1885-86. The requirements have been steadily advanced until now the State of New York¹ and the university colleges require a 4-year high-school course.

Regents of the University of the State of New York, adopted April 26, 1906.—Require "an approved secondary course for admission to dental schools"; certain subjects "are deemed essential to a sound education and should be prescribed"; same for all students preparing to enter professional schools and for all students entering dental schools. The secondary course approved requires 25 periods per week for 38 units for 4 years.

State University of Iowa, March, 1911.—Has adopted the standard of the regents of the University of the State of New York and has added 1 year in chemistry, to be effective in 1912-13.

University of Pennsylvania.—60 counts, or "the equivalent of these counts in high-school subjects attested by certificates or diplomas issued by approved high schools or literary colleges"; applicants may be admitted on 45 counts, the other 15 to be made up. The count values "are based upon work throughout a standard academic year" of 38 weeks. In lieu of diploma or certificate a matriculate examination is required.

COMBINED COURSES.

The University of Michigan offers a combined literary and dental course. It provides that—

Students desiring to obtain the degrees of bachelor of arts in the department of literature, science, and the arts, and of doctor of dental surgery in the college of dental surgery, may, by enrolling on the combined literary and dental course, shorten from 7 years to 6 the time required to earn the two degrees.

At the State University of Iowa the courses are so combined that the degrees of M. D. and D. D. S. may be taken in 6 years. To make this combination of courses, the student must meet the admission requirements of the medical colleges.

METHODS OF INSTRUCTION.

The methods of instruction have advanced from the lecture system to the use of demonstrations, practical exercises, laboratory, and clinics. The work is supplemented by note taking, quizzes, and written examinations. Courses of instruction are prescribed practically without exception.

The following are specimen curricula:

HARVARD.

First year.—Anatomy, dissection, physiology, histology and embryology; physiological, pathological, and dental chemistry, and metallurgy.

Second year.—Oral pathology, operative dentistry, oral surgery, prosthetic dentistry, orthodontia, porcelain work, general and dental materia medica and therapeutics, bacteriology, crown and bridge work, and practical work daily in the prosthetic laboratory and in the operative infirmary.

¹Higher Education, Dentistry, Handbook, 10, p. 11.

Third year.—Operative dentistry, oral surgery, prosthetic dentistry, orthodontia, porcelain work, neurology, surgical pathology and surgery, crown and bridge work, dental jurisprudence, and practical work in operative infirmary and prosthetic laboratory.

PENNSYLVANIA.

First year.—Chemistry, anatomy, histology, osteology, materia medica, operative and mechanical technics, operative and mechanical dentistry, and physical education.

Second year.—Materia medica, physiology, operative and mechanical dentistry and metallurgy, dental pathology and therapeutics, bacteriology, applied anatomy and oral surgery; work in practical anatomy (dissecting) is finished during this year; operative and mechanical work, with the privilege of the operating room and appliances during the morning and afternoon clinics; the final examinations of the second year will be upon materia medica, physiology, bacteriology, applied anatomy, and progress in operative and mechanical dentistry.

Third year.—Operative dentistry, mechanical dentistry, and dental metallurgy, and the lectures on these subjects, together with dental pathology and therapeutics, oral surgery and orthodontia; examinations at mid-term of the third year will be held upon one-half of the subject of oral surgery and upon the following minor subjects: Dental metallurgy, ceramics, crown-and-bridge work, orthodontia, and anesthesia. At the close of the term, examinations will be held upon operative dentistry, prosthetic dentistry, dental pathology and therapeutics, and oral surgery.

REQUIREMENTS FOR GRADUATION AND FOR DEGREES.

At the beginning, 2 terms of 4 months each, and in some cases 1 term of 4 months, and a statement of previous study, easily made, sufficed. The course was lengthened from 2 years of 4 months each to 3 years of 6 months each, and is now 3 years of 9 months. The extension to 3 years took place at Harvard in 1890. The program of instruction has been graded. In the earlier regulations, even the Dental Faculties Association discouraged the migration of students and did not permit the giving of advanced standing. Now there is provision that graduation from a medical school in general should give at least 1 year of advanced standing.

The requirements of the State of New York are as follows:

The regents shall admit to examination any candidate who shall pay the fee herein prescribed and submit satisfactory evidence, verified by oath if required, that he—

1. Is more than 21 years of age.
2. Is of good moral character.
3. Has a preliminary education equivalent to graduation from a 4-year high-school course registered by the regents, or an education accepted by the regents as fully equivalent.
4. Subsequently to receiving such preliminary education either has been graduated in course with a dental degree from a registered dental school, or else, having been graduated in course from a registered medical school with a degree of doctor of medicine, has pursued thereafter a course of special study of dentistry for at least 2 years in a registered dental school, and received therefrom its degree of doctor of dental surgery, or else holds a diploma or license conferring full right to practice dentistry in some foreign country and granted by some registered authority.

The standard degrees are: Doctor of Dental Surgery (D. D. S.), given at Michigan, Pennsylvania, Iowa, and Illinois; Doctor of Dental Medicine (D. D. M.), given at Harvard; and Doctor of Dental Science (D. D. Sc.), given at Michigan for advanced or graduate work.

The requirements of the regents of the University of the State of New York are here given, followed by those of Harvard:

The degree of doctor of dental surgery is the only one conferred by the schools of this State and may not be conferred on anyone till he has satisfactorily completed in a registered dental school (1) a course of at least 3 years, or (2) a special course of at least 2 years after graduation in course from a registered medical school. The degree can not be conferred on anyone unless, prior to matriculation in the institution conferring the degree or before beginning the second annual course counted toward the degree, he has filed with the institution a dental student certificate as evidence of the required preliminary education.

Harvard.—The degree of doctor of dental medicine (*Dentariæ Medicinæ Doctoris*) may be conferred upon any candidate of adult age, and of good moral character, who has passed all the required examinations. He must also give evidence of having studied medicine or dentistry in some recognized school 3 full years, the last continuous year of which must have been spent at this school. * * * Graduates from other reputable dental schools whose course of instruction consists of 3 years of 9 months each may obtain the degree of doctor of dental medicine by spending 1 year in the school and passing the required examinations.

Michigan.—Offers the degree of doctor of dental science (*D. D. Sc.*) to graduate students only who complete the course or “a course embracing an equivalent amount of scientific work.” The purpose of the course is—

to meet the requests of students for further opportunity to pursue the scientific branches and also to meet an often expressed wish on the part of practitioners to pursue some special scientific investigation which has been entered upon at home with limited resources. * * * The graduate course is open only to graduates of this college who have made marked records in their undergraduate work, and to graduates of this and other colleges who have had at least 2 years of continuous practice since graduation, and who have published original articles of scientific value which show a capacity on their part for continuing such work with credit.

The course of study is independent of and additional to the regular undergraduate work, and embraces only such topics as will aid in training men to carry on scientific researches in subjects associated with practical dentistry, or with dentistry in its scientific aspect.

SUMMARY.

The ultimate requirement of the same standard of admission to the colleges of dentistry as to the colleges of medicine—not less than 2 years of collegiate preliminary education in advance of the secondary—may come somewhat slowly. The marvelous progress of this new and rising profession since 1839, and the equal demonstration that it is a profession differentiated from the medical profession, while in some sense it forms a section in medical education, are promising. The organization of the University Dental Faculties Association is a part of the centralizing of professional education within the universities. It parallels the similar movement in law, medicine, engineering, architecture, and pedagogy. It means the elevation in fact of dentistry as a discipline in higher education and the elimination of the commercial school.

CHAPTER VII.

STANDARDS OF SCHOOLS OF PHARMACY.

Practically there was no education in pharmacy in this country until 1821, except for the apprentice system, where the lad was indentured in the old-fashioned shop of an apothecary for 6 years.¹ To Dr. John Morgan is given the credit of originating pharmacy in the United States. Returning from Europe to Philadelphia in 1765, he was the first to institute the European practice of writing prescriptions and having them compounded by competent apothecaries. The practice spread slowly. It was more than 50 years later, in 1816, before any attempt was made to teach pharmacy by means of a regular course of lectures. Five years later, in February, 1821, the board of trustees of the University of Pennsylvania, acting on a recommendation from the professors of the medical faculty, adopted a resolution instituting the degree of master of pharmacy, and provisions were made for instituting a course of lectures on chemistry, materia medica, and pharmacy in the university. In addition to serving 3 years' apprenticeship with an apothecary or a master of pharmacy, attendance upon 2 courses of lectures in the new school was required. In April, 1821, 16 apothecaries received the degree of master of pharmacy.² The druggists and apothecaries of Philadelphia who had objections to academic and distinctive titles, with the old-time guild spirit in reaction against the school of the University of Pennsylvania, organized in 1821 a college of their own "for the twofold purpose of providing a system of instruction of pharmacy and subjecting themselves to regulations in their business." They refused to have degrees of any kind. Thus early the antagonism between the business and the profession of pharmacy appeared. The new college, however, in 1826 was compelled to pass a resolution that those who had completed the attendance on 2 courses of lectures, had passed a satisfactory examination in the branches taught, and were able to furnish satisfactory evidence that they had been engaged in the business of an apothecary, were to be adjudged "graduates in the Philadelphia College of Pharmacy." Thus in 1826 arose the degree of graduate in pharmacy, the first title being exactly "Graduate in the Philadelphia College of Pharmacy."

¹ Proc. Third Annual Meeting of Conf. of Pharm. Faculties, 1902, p. 7.

² Amer. Jour. Pharm., vol. 77, 1905, pp. 215 ff.

The absence of laws to regulate the practice of pharmacy or the sale of drugs, medicines, or poisons, the impossibility of fixing responsibility for deaths due to mistakes or of fixing the amount of adulteration of drugs, brought about the formation of associations, beginning in 1820, of the more intelligent apothecaries in several of the eastern cities. The 4 colleges—the Philadelphia College of Pharmacy (1821), the New York College of Pharmacy (1829), the Maryland College of Pharmacy (Baltimore, 1856), the Massachusetts College of Pharmacy (Boston, 1867)—corresponded with each other and were the pioneers in pharmaceutical education. In the West, Chicago College (1859), St. Louis (1866), Louisville (1870), and Cincinnati (1871) aided the educational movement. In 1850 the New York college called a convention for the purpose of getting a uniform enforcement of the United States drug inspection law, and appointed a committee to bring in plans for forming a national association, to meet annually, to promote a general advance in pharmaceutical education, to create a demand for a higher grade and quality of drugs, to suppress adulteration and empiricism, and in general to elevate the character and standing of American pharmacy. The convention voted to organize the American Pharmaceutical Association, which has become a national standardizing agency.

From the nature of the case a powerful influence in affecting pharmacy is the Pharmacopœia, standardizing prescriptions and qualities of drugs. In 1820 the first pharmacopœia was published by a convention of delegates from the medical society in the United States, with a similar representation from pharmaceutical organizations. It was essentially a convention of medical men, greatly influenced from Philadelphia, which was then the medical center. The United States Pharmacopœia, published by them, became the basis for Wood and Bache's Dispensatory, the authority for apothecaries throughout the country. The dispensatory was a private publication which, along with the pecuniary interests of the drug trade, thus early combined with the business interests of the guild of apothecaries, and tended to prevent progress in pharmacy and to spread a taint of commercialism. The Massachusetts College, without an educational school except for courses of lectures in the winter attended by apothecaries and their assistants, endeavored to elevate the standard of pharmacy in Boston. The college did not believe in a theoretical university education without a practical experience in a regular pharmacy and laboratory, and required a full 4 years' course of instruction with a reputable dispensary in addition to the full course of instruction in a regular college of pharmacy in order to obtain the degree of Ph. G. This college is typical of the guild colleges.

In 1860 the decennial pharmacopœia convention, through the influence of the pharmacists, made a revolution by abolishing the

measures of capacity of the old pharmacopœia, and expressing their formula by weight and parts, and making a uniform standard for all things in compounding. They also effected the organization of a large committee of final revision from different sections in the country. The Wood and Bache Dispensatory ignored the vote of the convention, with the result that in 1870 the colleges and the American Pharmaceutical Association accomplished a radical revolution.¹

The colleges established by the pharmaceutical society and encouraged by the American Pharmaceutical Association in the East, naturally under English traditions, were not annexed to colleges like Harvard and Yale, or until a late date, and then by affiliation, as at Columbia. We have seen how the University of Pennsylvania was discouraged and has not now a college of pharmacy.

The second distinct stage of collegiate education is marked, therefore, by the rise of the State university and the request of the State societies for instruction in these institutions belonging peculiarly to the people.² The German influence, perhaps, was felt in these institutions, the European governments, excepting in England, requiring for the practice of pharmacy from 5 to 10 years of special study as a preliminary education equivalent to that for entrance to universities.

The pharmaceutical education in a high collegiate sense, while presented very early as an ideal in a meeting of the American Pharmaceutical Association and also strongly opposed there, may be dated from the formation of the American Conference of Pharmaceutical Faculties in 1899. This organization, aided by the action of the State boards of pharmacy and inspired by the legislation of the State of New York and more recently by other States, like Pennsylvania, is raising standards and securing a degree of uniformity. The example set by the American Medical Association, council, and colleges, is also impelling a forward movement.

REGISTRATION OF PHARMACY SCHOOLS.

The regents of the University of the State of New York require a registration of pharmacy schools, under essentially the following minimum qualifications:

(1) The value of apparatus and equipment shall be at least \$5,000. (2) Not less than 3 professors shall be employed regularly in giving instruction. (3) Practical work shall be required in not less than 3 laboratory courses, including chemistry, pharmacy, and materia medica. (4) 17 years shall be the minimum age for admission to the pharmacy school and not less than 15 counts (academic) or the educational equivalent shall be the scholastic requirement. (5) Satisfactory evidence of good moral char-

¹ Proc. Amer. Pharm. Assoc., vol. 41, 1893, p. 223 ff.

² Proc. 4th an. meeting of Amer. Conf. Pharm. Fac., p. 4.

acter shall be required for graduation. (6) The minimum course of instruction for any one year shall be not less than 25 weeks of 15 hours a week and at least 2 months must intervene between the close of the first year and the opening of the second year of the course. A minimum of 1,000 recitation and laboratory hours shall be required. An hour is the measure of the work prepared for a weekly recitation, lecture, or quiz in a higher institution. (7) Only such schools shall be registered as maintain day sessions (the minimum requirements met prior to 6 p. m.). (8) The details for registration shall be completed when referred to the committee for approval. (9) Foreign schools applying for registration shall meet the same requirements as the schools of the United States. (10) Pharmacy schools shall be accredited as they meet one, or more, year's professional requirements for such recognition. (11) No time allowance shall be accorded the diplomas of doctors of medicine, dental surgery, or veterinary medicine in lieu of professional requirements for admission to the pharmacy licensing examination. (12) Schools without the State may be required to furnish lists of matriculates the same as New York schools.¹

ADMISSION REQUIREMENTS.

Regents of the University of the State of New York.—The minimum requirement is the successful completion of one year of a registered secondary-school course, "or its equivalent, 15 regents' academic counts;" examination in English for foreigners. For admission to the pharmacy licensing examination the applicant must present "the diploma of a pharmacy school, college, or department of a university incorporated and registered by the regents as maintaining a proper pharmacy standard."

Columbia.—11½ units.

Illinois.—Those admitted to the course leading to degree of pharmaceutical chemist must be 17 years old and "graduates of accredited high schools or furnish evidence of a preliminary education equivalent thereto." Those seeking degree of graduate in pharmacy must be 17 or have completed "one year of high-school work or its full educational equivalent."

Michigan.—To 2-year course, leading to degree of pharmaceutical chemist: 16 years of age; "graduation in any of the full courses of the schools approved;" students who have completed at least 1 year's work in an approved college; graduates of reputable colleges of medicine or pharmacy. Others must present "satisfactory credentials" or take an examination in 15 units (a unit equals 5 recitations per week through the school year). The requirements for admission to the 4-year course leading to the degree of bachelor of science in pharmacy are the same as those for admission to the department of literature, science, and arts.

State University of Iowa.—Requires 2 years of high-school work, or 8 units.

Kansas.—For the 2 or 3 year course: Graduation from the 8th grade and in addition high-school work in physics, Latin, and botany. For the 4-year course a 4-year high-school preparation.

Nebraska.—For the 2 and 3 year course: 2 years of 16 points of high-school preparation, with conditions.

REQUIREMENTS FOR GRADUATION.

Pharmaceutical education has to contend with a variety of conditions. There is the demand for a practitioner's course, for an ordinary drug clerk with the mixed business that has gathered in the drug store. Secondly, there still survives the importance of trained men to make

¹ New York Education Department. Handbook 11, Higher Education, Pharmacy, June, 1910, pp. 47-50.

up prescriptions. Thirdly, the advance of science yielding many new preparations which must be intelligently handled. Fourth, the pure-food laws calling for specialists. The courses for graduation show an attempt to meet these varied demands. The university colleges, with laboratory equipment and often with hospitals and dispensaries, giving an opportunity for practice, eliminate the requirement of drug-store experience, so important in the earlier days of pharmacy colleges rising out of the apprentice stage. The detached proprietary colleges, survivors of the guild institutions and generally without hospitals or dispensaries to serve them, emphasize still the store experience. The result is that there are various groups or courses of study leading to various degrees.

GRADUATION AND DEGREES.

Columbia.—Offers a college course of 2 years leading to the degree of graduate in pharmacy, conferred by the college and qualifying for position as licensed pharmacist; a university course of 2 years, more advanced in character than the former, pursued through the academic year and leading to degree of pharmaceutical chemist, conferred by the university; a third or graduate course of 1 year leading to doctor of pharmacy fits graduates for positions as analysts and microscopists. A fourth year may be added to the 3 above which makes the entire course of 4 years equal to that leading to the bachelor of science degree. Other courses offered—1 year in the microscopical and chemical analysis of foods and drugs; summer preparatory course of 12 weeks; various special courses for which certificates, but not diplomas, are granted.

Nebraska.—Two-year course of 28 and 34 semester hours, respectively, leading to graduate in pharmacy (Ph. G.); a 3-year course leading to pharmaceutical chemist (Ph. C.), the first 2 years as above, the third representing 36 semester hours of elective work in advanced courses; a 4-year course leads to degree of bachelor of science in pharmacy (B. S. in Pharmacy). It demands 32, 31, 35, and 33 semester hours, respectively.

Michigan.—Two-year course required for degree of pharmaceutical chemist. The studies of these years "constitute an amount of work which taxes the full working power of a student of average quickness and strength of scholarship." The 4-year course leads to degree of bachelor of science in pharmacy and requires not less than 120 hours of credit. Advanced courses covering 1 year are offered to graduates who wish to take the degree of master of science in pharmacy.

COMBINED COURSES.

In the 2-year courses the studies are practically prescribed. There is opportunity for elective work in the 3-year course, but there is the beginning of combined courses in the third and fourth year courses. The group courses in these colleges in effect round out the equivalent of the undergraduate courses in the college of liberal arts.

A national syllabus committee of the American Conference of Pharmaceutical Faculties, representing boards and colleges of pharmacy, has made various reports in an endeavor to outline a minimum course of study for the guidance of pharmacy schools and State boards of pharmacy.¹

¹ Proc. Amer. Conf. Pharm. Faculties, 1907 p. 27 ff.

DEGREES.

Perhaps there has been more of discussion concerning degrees in this new profession of pharmacy than in any other field. As was seen above, a prejudice so far prevails that the standard degree is still not in line with the university terminology, but with the language of the guild—Graduate in Pharmacy (Ph. G.), Pharmaceutical Chemist (Ph. C.). A committee reported as follows:

Resolved, That the American Conference of Pharmaceutical Faculties recommend: (1) A minimum preliminary educational requirement of high-school work of 4 years for the degree of doctor of pharmacy (Phar. D.), 2 years for the degree of pharmaceutical chemist (Ph. C.), and 1 year for the degree of graduate in pharmacy (Ph. G.).

(2) That this standard be raised as rapidly as practicable to the preliminary requirement of 4 years of college work, i. e., graduation from college, for the degree of doctor of pharmacy, and 4 years of high-school work, i. e., graduation in a high school or preparatory school of equal grade for the degree of pharmaceutical chemist, or the degree of graduate in pharmacy.

The minimum preliminary education proposed is that laid down in the requirements for membership in the conference, so that any student now admitted to a college represented in the conference would be eligible to the degree of Ph. G. under this resolution.¹

The degree of bachelor in pharmacy (Phar. B.), master of pharmacy (Phar. M.), and doctor of pharmacy (Phar. D.), have been urged.² Earlier the analogy with the M. D. degree was pressed for the establishment of the degree of doctor of pharmacy.³ There is the incongruity that the degree of doctor of pharmacy as offered, for example by Columbia, is not equal by one year to that of bachelor of pharmacy. Wisconsin offers the following:

The first degrees given in pharmacy are that of graduate in pharmacy, upon completion of the 2-year course, and that of bachelor of science, pharmacy course, conferred upon candidates who have successfully met the requirements of the 4-year course.

The degree of master of pharmacy is conferred as a second degree upon graduates in pharmacy.

The degrees of master of science and doctor of philosophy are conferred as higher degrees upon candidates who have a baccalaureate degree.

Similarly, Kansas gives the degree of bachelor of science so that the student graduates on a plane with the student of the regular college. This opens the door to the degrees of master of arts and doctor of philosophy for those who wish higher educational or technical work.

SUMMARY.

It is clear that pharmacy, the youngest of the professional schools taken up in the academic world excepting journalism, is making rapid progress. The universities are being led in the applications of

¹ Proc. Amer. Conf. Pharm. Faculties, 1907, pp. 36 ff.

² Proc. 6th An. meeting Amer. Pharm. Faculties, pp. 15 ff.

³ Ibid., p. 215, for 1905.

science in this field to foster a form of secondary education and to render a great service to the public welfare that does not need to be carried on at many centers. There is an economy and efficiency in annexing this work to the university and supplementing chemical and medical subjects. In the meantime pharmacy is being developed as a modern profession, not only meeting the earlier demands of the medical profession but offering an opportunity for investigation and its application to problems in science affecting the welfare of the State.

CHAPTER VIII.

STANDARDS OF SCHOOLS OF FINE ARTS AND MUSIC.

In 1791 Charles Willson Peale tried to found an Art School in Philadelphia. He was not successful, but his attempt led, in 1805, to the organization of the Pennsylvania Academy of the Fine Arts, the oldest art institution in this country. The National Academy of Design, organized in 1826, traces its origin back to 1802, when the New York Academy of Fine Arts was founded. The organization that reaches the largest number of people is the American Federation of Arts, whose first annual convention was held in Washington, D. C., in May, 1910. This federation consists of 103 chapters (societies), representing in the aggregate about 50,000 persons and over 1,000 individual associate members. All the arts are represented—architecture, painting, sculpture, music, literature, the theater, and the handicrafts.¹

Municipal art organizations and commissions, art museums, the various societies in the different branches of art, like the National Sculptors' Society, the American Institute of Architects, the American Society of Landscape Architects, to say nothing of musical societies, made possible the organization of the American Federation of Arts mentioned above. It would seem that last of all, and largely by a repetition of the history of the other professional schools, art education is to come to its own. The schools established are largely private and local. The voluntary societies now springing up are federating themselves, and will in due time become a unifying and standardizing force. The colleges and universities have recognized art comparatively recently. The final report of the committee on the condition of art work in colleges and universities in the annual report of 1910 of the Western Drawing and Manual Training Association gives the latest general view. The general art courses of the universities composing the Association of American Universities are shown in the following table:

Art courses of universities.

Colleges.	College courses.		Professional courses.		
	History.	Practice...	Architecture..	Painting..	Sculpture.
University of California.....	History.	Practice...	Architecture..	Painting..	Do.
Catholic University of America.....	History.	Practice...	Architecture..	Painting..	
University of Chicago.....	History.	Practice...	Architecture..	Painting..	
Clark University.....	History.	Practice...	Architecture..	Painting..	
Columbia University.....	History.	Practice...	Architecture..	Painting..	
Cornell University.....	do.....	do.....	do.....	Painting..	
Harvard University.....	do.....	do.....	do.....	Painting..	
University of Illinois.....	do.....	do.....	do.....	Painting..	
Indiana University.....	do.....	do.....	do.....	Painting..	
State University of Iowa ²	do.....	do.....	do.....	Painting..	
Johns Hopkins University.....	do.....	do.....	do.....	Painting..	

¹ American Year-Book, 1910, p. 737.

² College of fine arts organized in 1911.

Art courses of universities—Continued.

Colleges.	College courses.		Professional courses.		
	History.	Practice ..	Architecture	Painting..	Sculpture.
University of Kansas.....	History.	Practice ..	.....	Painting..	.....
Leland Stanford Junior University.....	..do.....	..do.....	.....	.....	.....
University of Michigan.....	..do.....	..do.....	Architecture	.....	.....
University of Missouri.....	..do.....	..do.....	.....	.....	.....
University of Minnesota.....	.....	..do.....	.....	.....	.....
University of Nebraska.....	History.	..do.....	.....	.....	.....
University of Pennsylvania.....	..do.....	.....	Architecture	.....	.....
Princeton University.....	..do.....	.....	.....	.....	.....
University of Virginia.....	.....	.....	.....	.....	.....
University of Wisconsin.....	.....	.....	.....	.....	.....
Yale University.....	History.	Practice...	Architecture.	Painting..	Sculpture.

These universities present several types of schools. The first is represented by the University of California, with strong collegiate courses, and even graduate courses in architecture, but with an annex of the San Francisco Institute of Art, which has no entrance requirements, with courses in drawing, painting, modeling, decorating, and design, leading to a university certificate of proficiency.

The second type is represented by Columbia, with full collegiate standards, a college and faculty of fine arts, with the degree of A. B. or B. S., a special faculty of fine arts, including schools of architecture, music, and design, leading to the degrees of bachelor in architecture, bachelor of music, and a proposed degree of bachelor of design. The work of the school of architecture in this university is some 30 years old; the next oldest school is that in design, dating from 1906. Cornell has a 4-year course leading to the degree of bachelor of architecture. Yale was one of the earliest leaders among colleges of this type with a school of fine arts, aiming to provide thorough technical instruction in the arts of design, drawing, painting, sculpture, and architecture, and in illustrative decoration and copper-plate etching. The professional school of art aims to furnish a thorough course of art in the practice of the studios. These departments of practice and criticism may be regarded as distinct or correlative. At Yale, lectures in fine arts are allowed credit in the junior and senior year, and the graduate school carries the fine arts into a group of languages, literature, and the arts, leading to the degrees of A. M. and Ph. D. The courses are in painting, modeling, drawing, architecture, and anatomy. The regular prescribed course of study for students covers a period of 3 years. Certificates are awarded to those completing the regular course of 3 years, and the degree of bachelor of fine arts is conferred by the university upon those who have fulfilled the requirement of a prescribed course of advanced studies, and have submitted an approved original composition in painting, sculpture, or architecture, and a satisfactory thesis on some topic relating to the fine arts.

Harvard germinally belongs to this type of institution. The department of fine arts is under the faculty of arts and sciences, and students enter the graduate school of the arts and sciences. It includes 3 departments, the department of history and principles of fine arts, the department of architecture, and the department of landscape architecture.

The instruction provided by these departments is intended to afford a basis for a comprehensive knowledge of the history and principles of the fine arts from ancient times to the present day, to provide a certain amount of training in drawing and painting, and to offer to students of architecture and landscape architecture an opportunity to prepare themselves for the practice of those professions.

The more elementary courses offered by these departments are not highly technical in character, and may profitably be taken by students who do not look forward to a professional career. These courses are open to properly qualified undergraduates in Harvard College, and may be counted for the degrees of A. B. and S. B.

All the more advanced courses offered by the department of architecture and the department of landscape architecture are distinctly professional in character, and form parts of regular programs of study leading to the degrees of master in architecture and master in landscape architecture.

Five full and two half courses are offered in the department of the history and principles of the fine arts, 8 or 9 full and 2 half courses, for undergraduates and graduates in the department of architecture, and 5 full and 2 half courses primarily for graduates. These last courses may not be counted toward the A. B. and S. B. degrees.

The third type is represented by a university like Indiana, which has a department of fine arts in a college of liberal arts.

The aim of the work in this department is [to] lead students to an appreciation of the fine arts rather than to the practice of them. Instruction is offered in drawing and the use of water colors, in figure sketching, perspective, composition, and design. This instruction in practice is intended to give beginners, as well as more advanced students, such comprehension of the principles of art as will be of assistance in other branches of their college work, by developing an appreciation of beauty and increasing keenness of perception. It is further intended to give students an understanding of actual technique.

The subject matter of the lectures, primarily historical and critical, is illustrated by the casts, collections of photographs and engravings, and original works belonging to the fine arts collection.

The courses deal with the history of architecture and painting, and with criticism, and give practice in drawing, water-color painting, and design. Full recognition is given toward the A. B. and A. M. degrees.¹

Another type is perhaps represented by Princeton, where the department of art and architecture offers junior, senior, and graduate work in the history of ancient, mediæval, and renaissance art. The graduate school also recognizes art and archeology with the courses in Greek architecture and painting, in Christian architecture, and in renaissance architecture, with several more purely archeological courses.

¹Final report of the committee on the condition of art work in colleges and universities, pp. 5-6.

Syracuse represents a type with a college of fine arts, with courses leading to the degree of bachelor of architecture and bachelor of painting, and with low admission requirements.

Many colleges have art as an incident, as, for example, Williams College, with 12 hours in the history of art and civilization.

Vigorous and highly developed courses in architecture leading to regular degrees are maintained by the Massachusetts Institute of Technology, University of Pennsylvania, University of Illinois, and Washington University.

REQUIREMENTS FOR GRADUATION.

The ripest development of fine arts is well represented by Yale and Columbia. They represent the development practically of a school correlating the great departments of art, drawing, painting, sculpture, architecture, music, and a relation to the branches of learning, like the philosophy, history, and criticism of art. In short, they are combined professional schools and cultural departments, making provision for some elementary work, particularly for teachers. For instance, Columbia represents an intermediate requirement of about two-thirds of collegiate preparation: For admission to the school of architecture, $9\frac{1}{2}$ units, elective 6; to school of music, $9\frac{1}{2}$ units, elective $6\frac{1}{2}$; to school of design, $9\frac{1}{2}$, elective $3\frac{1}{2}$.

For admission to the courses leading to the degree bachelor of music: Completion of 62 points of credit in Columbia or Barnard (substantially 2 years' undergraduate study) or of "their equivalent elsewhere." The ability to play on the pianoforte the two-part inventions of Bach.

At Yale the technical course, constituting a grammar of art as a foundation for all forms of special application, is distributed over 3 years. Elementary and advanced work in drawing, painting, sculpture, architecture, anatomy, perspective, and composition are offered. Elective courses are provided in the senior and junior classes of the academical department. We may note here possibly germinal combined courses.

The department of music aims to instruct those who intend to become musicians by profession, either as teachers or as composers, and to afford a course of study for such as intend to devote themselves to musical criticism and the literature of music. The work is divided into theoretical and practical courses of study. The department is open to undergraduates and graduates, also to special students.

The faculty of fine arts at Columbia embraces the work of the schools of architecture, music, and design. It became so in 1906, work in architecture having been carried on at the university for 30 years and in music about 15. In the desire to provide for the needs of

the university students seeking opportunities in the study of painting, sculpture, and decoration, the university effected coordination with a school of design, the practical work being offered in connection with courses offered by the National Academy of Design.¹

The courses required for graduation present typical curricula:

Columbia.—For the degree of bachelor of architecture there is required 4 years' work, aggregating 153 points; for certificate in architecture, 129 points; for degree in architectural engineering, 153 points. Courses in landscape gardening and graduate courses are offered. For degree of bachelor of music 75 points are required, in part prescribed, in part elective, together with "a satisfactory original composition for orchestra or with orchestral accompaniment and submission of an essay on a musical subject." For certificate of proficiency, as above, except only 50 points of credit are required. Certificate of proficiency in design, 115 points, of which 47 are in prescribed courses, 10 to 25 in elective courses, and the remainder to studio work.

DEGREES.

In the colleges of liberal arts a minimum amount of credit toward the bachelor's degree is allowed for art and a still lower amount ordinarily for music. Certificates of proficiency are given by the larger institutions for the elementary and shorter course. The degrees given by these institutions in the professional courses are usually those of bachelor; for example, of architecture or music. Where there is graduate research, the arts are accepted as a minor subject for the degrees of master of arts and doctor of philosophy, the work being taken under one of the graduate faculties.

SUMMARY.

The incipient condition of fine arts as an organized department may be inferred from the fact that even the Bureau of Education in its chapter on professional schools (1910, Vol. II, p. 1017), in the general summary of statistics of professional schools, does not include fine arts or music.

¹ Cat., 1910-11, pp. 322-328.

CHAPTER IX.

STANDARDS OF UNIVERSITIES.

The university as contradistinguished from the college in the United States in ideal is old, in realization is young. The colonial Englishman in the Massachusetts Bay Colony in 1636 and the immediate succeeding years used the term "university" and also "college." As these men were graduates of Oxford and Cambridge, they must have known the difference between a college and a group of colleges making a university. As, however, in the seventeenth century, in the English universities the colleges had come to dominate the university, their consciousness of the difference perhaps was not acute.

The official publications of Harvard, particularly in the first half of the nineteenth century, had numerous variations as to the official style of the institution. The Ordinance of 1787 uses the term "seminaries." Those who opened the earliest State universities, like the University of North Carolina in 1795, of Georgia, Ohio, and Virginia, and later the University of Michigan in 1837, as well as the latest State universities, in their charters or statutes used the name "university" and presented an ideal much beyond that of the college. The following excerpts show the prevalence of the idea of an institution with advanced work and a grouping of professional schools with liberal arts:

The object of the University of Minnesota, established by the constitution at or near the Falls of St. Anthony, shall be to provide the means of acquiring a thorough knowledge of the various branches of literature, science, and the arts, and such branches of learning as are related to agriculture and the mechanic arts, including military tactics and other scientific and classical studies.¹

The object of the University of Idaho shall be to provide the means of acquiring a thorough knowledge of the various branches of learning connected with scientific, industrial, and professional pursuits, and to this end it shall consist of the following colleges or departments, to wit: First, the college or department of arts; second, the college or department of letters; third, the professional or other colleges or departments as may from time to time be added thereto or connected therewith.²

At the time of the founding of the universities the influence of the highly developed colleges, the manning of the universities by college graduates, and the poverty of the institutions inaugurated them as colleges. Aside from the shadowy introduction of the ideals

¹ Section 327, 1894, Laws of Minnesota, relating to the public-school system, including the State normal schools and the University of Minnesota (1901).

² Section 938, General School Laws of the State of Idaho, 1905.

of France for a university in the constitution of the State of New York in 1784, making all schools a component part of the university, and the influence of German and French universities upon Jefferson in founding the University of Virginia, perhaps the first home-born movement was at Harvard in the decade between 1820 and 1830. Up to this time English heredity had shaped Harvard and Yale and their compeers. The return of American scholars like George Ticknor from Europe to Harvard, the outcome of theological and philosophical polemics stirring new thought, and the beginning of professional schools, brought the awakening of the modern university. Before the elective system appeared in the college the university idea was making itself felt in the older foundations generally. The vagueness of the university notion is illustrated by the use of the term "university student" at Harvard beginning in the decade between 1820 and 1830 for a partial-course student. The idea seems to have been that such a person could be allowed to take what he wished. This was university freedom. The phrase "university student" was used in this sense even by Williams College in the forties and continued until 1861, when it was supplanted by the term "partial student."

The State universities with their professional schools, springing up very early, and influenced about the middle of the century by Michigan, to which Tappan had brought the ideas of the modern German university, furthered the development of a genuine university. Thus the ground was prepared for Johns Hopkins, under the leadership of President Gilman, schooled at Yale, in Europe, and in the University of California, to become in 1876 the definite example of an American university with the establishment of graduate work as truly university work.

President Eliot, who had begun his struggle in 1869, saw Harvard thoroughly possessed of the university ideals by 1886, and President Dwight accomplished the change of title from Yale College to Yale University in 1887. Cornell had launched the idea of the enlargement of the scope of university instruction. The colleges, alarmed by the rapid development of the universities, fearing that their ideal would be lost and that they would be swallowed up, entered their protests.¹

The central idea of a standard university as a place for investigation and research issues in the emphasis upon graduate work. The history of the organization of the graduate school of arts and sciences at Harvard is a good illustration of the evolution of the idea.

The graduate school of arts and sciences came into existence as a result of action taken in January, 1872, by the corporation and overseers of Harvard College in the establishment of higher degrees in arts, science, and philosophy, to follow upon the degrees of bachelor of arts and bachelor of science, and has for its object the develop-

¹ See Introduction, p. 31.

ment of instruction suited to the needs of persons qualifying themselves for such higher degrees or otherwise engaged in advanced study. Until 1890 it had little formal organization, and was known as the graduate department. In 1890 it was more solidly established under the name of the graduate school. In 1905, on recommendation of the faculty of arts and sciences, its name was changed to the graduate school of arts and sciences. Many students come to the school for the sake of instruction only and do not become candidates for a degree.¹

The Association of American Universities, formed in 1900, was a symptom that the genuine universities, emphasizing graduate work as the central thing, felt the need of separating themselves from the collegiate institutions. The National Association of State Universities, organized in 1896, was another evidence of the awakening of the university consciousness. These associations, having in part a common membership, have advanced a statement which is temporarily accepted as the definition of a standard American university. It is embodied in the following report of the committee on standards of American universities, which was adopted in 1908 by the National Association of State Universities:

Your committee believes that there are certain clearly marked tendencies or forces at work in our American society toward a development, at no distant date, of a typical institution of learning, which we may not improperly call the standard American university.

This institution will, for an indefinite time, include as an important part of its organization what we may call a standard American college, with a 4-year curriculum, with a tendency to differentiate its parts in such a way that the first 2 years shall be looked upon as a continuation of, and a supplement to, the work of secondary instruction, as given in the high school, while the last 2 years shall be shaped more and more distinctly in the direction of special, advanced or university instruction, rising gradually into the advanced work of the graduate school.

The standard American university will also include as a distinct department the graduate school or philosophical faculty.

It will also include as organic parts of the institution in its fully developed form various professional schools, such as law, medicine, and engineering.

Present tendencies point, in our opinion then, to a definite differentiation in the work of the college at the close of the sophomore year toward university work in the real sense. If these views are just, we suggest the following formulation of principles underlying the organization of such an institution and we may define the standard American university to be an institution: (1) Which requires for admission the completion of the curriculum of a standard American high school with a 4-years course, or in other terms, the completion of a course which will enable the pupils to offer not less than fourteen 5-hour units, or equivalent; (2) which offers in the college of literature and science 2 years of general or liberal work completing or supplementing the work of the high school; (3) which offers a further course of 2 years so arranged that the student may begin work of university character leading to the bachelor's degree at the end and reaching forward to the continuation of this work in the graduate school or the professional school; (4) which offers professional courses, based upon the completion of 2 years of collegiate work, in law, or medicine or engineering; (5) which offers in the graduate school an adequate course leading to the degree of doctor of philosophy.

¹ Harvard University Catalogue, 1911-12, p. 577.

It is recommended that this association recognize any institution, in whole or in part, doing work of this grade as, in so far, doing work of university quality.

In recommending that university work begin with the junior year of the college and that the professional schools be based on the first 2 years of college, the report is in line with present tendencies. It is in accord with the growing belief that the work of the last 2 years of college should be organized into groups that aim at more definite results, and lead to greater efficiency. But this is only the first of many problems. We are facing questions of the time beyond the junior year for attaining the Ph. D. degree, of adjusting the scheme of counting the last 2 years toward both arts and professional degrees, of the place of the A. B. degree, of the age when the period of general education should end, and of a possible reorganization of elementary and secondary education. But these questions are not ready for solution and hardly belong to the work of the committee at the present time.

In accordance with the foregoing definition of the standard American university, it is recommended that the following standards be set up:

1. *Time requirement for the bachelor's degree.*—Not less than 60 year-hours, or 12 units, of collegiate work shall be required for the bachelor's degree.

2. *Qualifications of teachers.*—It is expected that the teacher in the high school shall have the bachelor's degree, or show evidence of equivalent attainment, and it is recommended that he have the master's degree. As a rule, the professors of all ranks in the collegiate work shall have the degree of doctor of philosophy, or its equivalent. The professors giving instruction in graduate work are expected to show, in addition to the possession of a doctor's degree, or its equivalent, their scholastic ability by successful research and publication, and above all, they must have demonstrated that they have power as teachers to inspire the students with zeal for research. Indeed, it is understood that all the teachers should possess the power of imparting knowledge and of character building. In addition, the professors in the professional schools should give evidence of doing investigative work and those in technical schools, evidence of the power of practical research.

3. *Institutional facilities.*—(1) There should be adequate general and departmental libraries, with (a) sufficient number of duplicate books for purposes of undergraduate instruction, (b) where graduate work is offered, books, monographs, and other material for purposes of research. (2) There should be modern laboratories and apparatus, with (a) sufficient supervision for undergraduate teaching, (b) where graduate work is offered, research laboratories.

4. *Time units for degrees.*—Institutions providing for advanced work shall require 3 years or nine 5-hour units from the beginning of the junior year for the degree of master of arts, or 5 years or fifteen 5-hour units for the degree of doctor of philosophy, and with work in residence.

[The units shall not necessarily be schedule hours, but their equivalent, and shall include credit for research and thesis work. It is of course understood that from the beginning of the junior year, there is the adoption of a group system suggested by the honor schools in English universities, or the separate faculties in the German universities, and that the kind of instruction contemplates investigation—in short, science with power—as the purpose. It is the intent that the cultural atmosphere shall pervade the work of the student who begins specialization, and that something of the spirit of discovery and the earnestness it brings shall affect the cultural temper.]

5. *Scope of curriculum.*—To be a standard university an institution shall be equipped to give instruction leading to the degree of doctor of philosophy in at least 5 departments, according to the standard prescribed in this report, and shall have at least 1 university professional or technical school. The term *university professional* or *technical school* shall not be applied to any professional or technical school that does not require the 2 years' collegiate training for admission.

Your committee further recommends as follows:

Provision for recognition of other institutions.—Provision shall be made whereby institutions other than State universities may be freely welcomed to adhere to the standards set up by this association.¹

REQUIREMENTS FOR ADMISSION TO GRADUATE WORK AND FOR ADVANCED DEGREES.

The requirements for advanced degrees indicate the requirements for admission to graduate work and the scope of the work. The degree of master of arts, given in course 3 or 5 years after graduation upon the payment of a fee, has practically disappeared. The colleges that had this practice have set up standards requiring residence, examinations, and theses. The universities as distinct from colleges have set up strict standards for the master's degree, and also for the doctor's degree. The conferring of the doctor's degree *honoris causa* is practically almost dishonorable. The following requirements for these degrees will indicate the present standards in graduate work, the numbers under each institution representing the answers to the corresponding questions in the list given:

REQUIREMENTS FOR ADVANCED DEGREES.

1. What are the requirements, in the nature of bachelor's degrees from other institutions, for admission to advanced work in this university?
2. How are work and residence in other institutions considered?
3. Time required, and minimum time in residence?
4. Thesis? Must it be printed and copies presented to the university?
5. Number and character of minors?
6. Requirements in French and German?
7. Degrees granted?
8. General character and purpose of work required?

[The numbers indicate the questions to which answers are given.]

California.—Master's degree: 1. Must have bachelor's degree from a "reputable institution" or "any other degree or certificate which the graduate council may accept as equivalent;" may be admitted to undergraduate classes. 2 and 3. Candidates must have at least one year in residence; 18 units required; 10 may be taken in absentia. 4. Thesis, "typewritten or printed." 5. One or two minors. 7. M. A., M. L., M. S.

Doctor's degree: 1. Bachelor's degree or "a course of study equivalent." 2 and 3. Two years, at least one in residence. 4. Thesis. 5. One or two minors. 6. Reading knowledge. 7. Ph. D., J. D. 8. Degrees granted more "on attainments" than on "length of time of study."

Columbia.—Master's degree: 1. Bachelor's degree or "an education equivalent." 2. Work from other institutions may be credited. 3. One year at least, including summer courses. 4. Essay; 2 "written or typewritten copies." 5. Two minors. 7. A. M.

¹ Science, Jan. 29, 1909, pp. 171-173; Proc. of Nat. Assoc. State Univ., 1908, 147-157.

Doctor's degree: 1. See under master's degree. 2 and 3. Two years. 4. Thesis; printed; 30 copies to the university. 5. Two minors, consuming not more than half time. 6. Read at sight, and in some courses, Latin. 7. Ph. D.

Cornell.—Master's degree: 1. Must be a graduate of Cornell or have had "a course substantially equivalent." 2 and 3. One year. 4. Thesis; "bound copy" to the university. 5. One minor. 7. M. A., M. C. E., M. M. E., M. S. in Agriculture, M. S. in Architecture.

Doctor's degree: 1. Same as for master's degree. 2. May be accepted "by permission of faculty." 3. Three years, at least one in residence. 4. Thesis; 50 printed copies to the university. 5. "Major and minor subjects." 7. Ph. D.

Harvard.—Master's degree: 1. Graduate of Harvard, or of "an approved college." 2 and 3. One year in residence, but those without "sufficient preparation" require "at least two years." 6. Elementary knowledge. 7. A. M. 8. Course can not be made up wholly of professional studies.

Doctor's degree: 1. Same as for master's degree. 2 and 3. Not less than two years; one in residence, but time "wholly secondary." 4. Thesis; "printed or written copy." 6. Reading knowledge. 7. Ph. D. 8. "Long study and high attainments in a special branch of learning."

Illinois.—Master's degree: Graduation from this or "institutions of equal standing." 3. One year; graduates of Illinois may do the work in three years in absentia. 4. Thesis. This requirement may be waived. 5. One or two minors; half time on major subject. 7. Academic and professional degrees: A. M., M. S., M. Arct., Arct. Eng., C. E., E. E., Mech. E., Min. E. 8. Work required must be of "a high order" and such as to show that the candidate has done more "than merely acquire a certain amount of knowledge by rote." He must show "a broadening of the knowledge of his subject of study."

Doctor's degree: 1. See master's degree. 2. Residence counted. 3. Three years or more; first two years or last one must be in residence. 4. Thesis, which must show "power of independent research;" printed; 100 copies to university. 5. First minor closely related to major; second minor in another field. 6. Reading knowledge, also of "any other language needed." 7. Ph. D. 8. Degree given not for time spent, but "for scholarly attainments and power of investigation." Candidate must show "a thorough mastery of a selected field of study, evidence of the power of independent investigation in this field."

Indiana.—Master's degree: 1. Graduate "of this university, or of any other institution of equivalent standing." 2 and 3. Three full terms or 45 hours of university credits; one term may be done away from the university or all in summer terms. 4. Thesis, except in Latin. 5. Thirty hours in one department, of which 15 "must be distinctively graduate in character." 7. A. M.

Doctor's degree: 1. See master's degree. 2 and 3. Three years, a "part" of which "may be spent in residence at other universities." 4. Thesis; printed; five copies to university. 5. Two minors; one not related to major. 6. Reading knowledge. 7. Ph. D. 8. Thesis "must always give evidence that the candidate is capable of forming an independent judgment upon the recent literature of his department."

Iowa.—Master's degree: 1. Graduate of this or of "an accredited university or college." 3. One year. 4. Thesis. 5. One minor, "closely allied." 7. A. M., M. S. in medicine. 8. A. M. is usually literary; M. S. is mainly scientific.

Doctor's degree: 1. Bachelor's degree from Iowa or "from some other of equal rank." 2 and 3. Three years; two in residence, including the last. 4. Thesis; printed; 100 copies. 5. One or two minors. 6. Reading knowledge. 7. Ph. D. 8. Thesis shall be "a contribution to the sum of human knowledge." Degree not conferred "simply in consequence of the fulfillment of any time requirement."

Kansas.—Master's degree: 1. Graduation from Kansas or other college or university of good standing. 2 and 3. One year, or 30 hours of work; half the year must be

spent at Kansas; five hours may be done in absentia, and a part may be done at summer schools. 4. Thesis. This may be waived. 5. One or two minors. 7. A. M., M. S., C. E., Min. E., Mech. E., Chem. E., E. E.

Doctor's degree: 1. Graduation from Kansas or some other college or university of good standing. 2 and 3. Must spend "three full college years in resident graduate work at this or some other approved university." 4. Thesis; printed; 100 copies. 5. One major and two minors, not more than two in same department. 7. Ph. D. 8. Thesis must be "the result of original research of a high character."

Leland Stanford.—Master's degree: 1. Graduates and others "who have had an equivalent training elsewhere." 3. One year. 4. Thesis, "as evidence of ability to do independent work." 7. A. M.

Doctor's degree: 1. Same as for master's degree. 2. May be accepted. 3. Three years; at least the last in residence. 4. Thesis; printed; 100 copies. 5. One or two minors; both of these may be waived. 6. Reading knowledge. 7. Ph. D. 8. Given "only on the ground of advanced scholarship and the ability to do independent work."

Michigan.—Master's degree: Graduation from this or other college or university of approved standing. 2 and 3. One year. Graduates of this university only may do part in absentia. 4. Thesis, usually waived. 5. Two minors; 2d minor in another department. 7. A. M., M. S. in Forestry (requires 2 years), M. in Landscape Design.

Doctor's degree: 1. Open to all bachelors; to be enrolled as candidate for the Ph. D. must spend 1 year or come from "graduate school of some other university," or be a graduate of Michigan. 2 and 3. Three years; last in the university. 4. Thesis must be "an original contribution to scholarship" or to scientific knowledge; printed, 150 copies. 5. Two minors, both cognate to the major. 6. Reading knowledge. 7. Ph. D., Sc. D. 8. Degree not won "merely by faithful and industrious work," but candidate must "evince ability to carry on independent research."

Minnesota.—Master's degree: 1. Graduation from Minnesota or some other university or college with an equivalent baccalaureate course. 3. One year. 4. Thesis, typewritten; may be printed. 5. Two minors; or in special cases one minor only. 7. M. A. for nontechnical work; M. S. for technical work.

Doctor's degree: 1. See master's degree. 2 and 3. Must be enrolled at least one year before degree is given and may not be enrolled until a year has been spent in postgraduate study; 3 years at least; 3d year in residence. 4. Thesis, typewritten. 5. Two minors. 6. Reading knowledge and in some cases Latin. 7. Ph. D., Sc. D.

Missouri.—Master's degree: 1. "Graduates of the colleges and universities comprising the Missouri College Union and of other reputable colleges and universities" and by special permission "other persons of liberal education" are admitted to the graduate school, but this in itself does not imply admission as candidate for advanced degrees.

Doctor's degree: 1. Must have completed undergraduate course "such as is offered by colleges of good standing" and have received degree equal to baccalaureate degree of the University of Missouri. 2. May be counted. 3. Last year must be spent at this university. 4. Thesis, printed, 150 copies. 5. One or two minors; two-thirds time to major. 6. Reading knowledge. 7. Ph. D. 8. Requirements "are not computed in terms of time and courses," but for "high attainment in some special branch of learning."

Nebraska.—Master's degree: 1. Graduation from an undergraduate college of this university or from some other college having equivalent course. 3. One year; may be fulfilled by 18 hours of work in summer sessions. 4. Thesis, typewritten. 5. "Major and minor studies." 7. A. M.

Doctor's degree: 1. See master's degree. 2. Two years may be counted. 3. Three years, the last in residence. 4. Thesis, printed, 100 copies. 6. Reading knowledge. 7. Ph. D.

Pennsylvania.—Master's degree: 1. Admission to the courses leading to the higher degrees lies with the group committee. 2 and 3. One year, but the 12 standard courses required may be distributed over three years. 7. A. M., M. S.

Doctor's degree: 1. See master's degree. 2 and 3. Not less than two years, and candidate must have completed "in this university or in other universities" not less than "24 standard courses or their equivalent." 4. Thesis, printed, 150 copies. 5. Two minors, each minor representing "not less than four standard courses." 6. Reading knowledge, also of any other language adjudged "to be essential to the prosecution of his major work." 7. Ph. D. 8. The degree is "conferred solely in recognition of marked ability and high attainments in some definite branch of learning."

Princeton.—Master's degree: 1. Bachelor of Princeton "or from other institutions maintaining a similar standard in distinctively liberal studies." Other graduates may be admitted to graduate standing and be allowed to make up deficiencies by undergraduate work. 2 and 3. One year in residence with "at least 3 graduate courses." 7. A. M.

Doctor's degree: 1. See master's degree. 2. Two years counted. 3. One year in residence; a minimum of 2 years and "in all but the rarest cases 3 years will be found necessary." 4. Thesis, printed, 100 copies. 5. May "substitute for a main division of his subject a like division of a germane subject; or he may be required to take additional work outside his subject" and must take 20 lectures "on the general trend of philosophical and scientific thought." 6. Reading knowledge. 7. Ph. D.

Virginia.—Master's degree: 1. "Baccalaureate degree from a recognized institution of collegiate rank," or in case of graduates without degree "certificate of graduation in a course of study accepted by the academic faculty as fully equivalent." May also be required to do undergraduate work. 2 and 3. Must complete work in 4 fully organized graduate courses of not less than 3 hours per week each. 5. The 4 courses must be chosen from at least 3 distinct subjects and 3 of the courses must be cognate. 7. M. A., M. S.

Doctor's degree: 1. See master's degree. 2 and 3. Must do the prescribed work in three cognate subjects from at least 2 academic schools, with 3 years' work in major, 2 in 1st minor and 1 in 2d minor and may be required "to attend such lectures or courses in any academic school as the professor may deem necessary." In certain cases only two years of residence required; the last year always in residence "unless the academic faculty shall for special reasons direct otherwise." 4. Thesis, printed, 100 copies. 5. Two minors. 6. Reading knowledge or 2 years' work. 7. Ph. D.

Wisconsin.—Master's degree: 1. Conferred on graduates of Wisconsin and upon other graduates "whose training has been substantially equivalent," judgment being based on "actual attainments" rather than on the institutions attended; undergraduate work may be done, but not counted. 2 and 3. Part of work may be done in absentia, but in no case with less than 1 semester in residence, carrying from 9 to 12 credits. For professional degree not less than one year. 4. Thesis, typewritten. 5. At least one-half of all the work "must lie in a single department." 7. M. A., Ph. M., C. E., Mech. E., E. E., Chem. E.

Doctor's degree: 1. See master's degree. 2 and 3. Three years, the first two or the last one must be spent at this university. 4. Thesis, printed, 100 copies. 5. Minors, representing 2 years' and 1 year's work; one in distinct department from major. 6. Reading knowledge. 7. Ph. D. 8. Degree granted not "solely as the result of faithful study extending over a prescribed time. Special attainments are required * * * particularly the power of independent investigation."

Yale.—Master's degree: 1. Conferred on men who are bachelors of arts of Yale or of "other colleges whose course of study is equivalent" upon "their giving to the college faculty evidence of satisfactory progress in liberal studies after receiving their first degree." Such evidence may be furnished by one year of systematic study in New Haven. "Graduates of other colleges can obtain the degree only" by 1 year's

residence. 2 and 3. (See 1.) Professional degrees require two years' work, and if the literary degree is taken in absentia, 3 years are required. 7. M. A., C. E., Mech. E., Min. E., M. S.

Doctor's degree: 1. See master's degree, but the doctor's degree may be conferred on women. 2 and 3. "A course of graduate study of at least 3 years." 4. Thesis, printed, 50 copies. 6. "A good knowledge of Latin, German, and French." 7. Ph. D. 8. Thesis must give "evidence of high attainment and power of investigation."

SUMMARY.

The development of graduate courses and advanced degrees in professional schools indicates the rapid evolution of a genuine university with the faculties interrelated in research work. One of the consequences is the appearance of combined courses, or their equivalents, and the differentiation of university as distinct from collegiate instruction at the beginning of the junior year of the liberal arts college. Upon this as a pivotal point turns the agitation in progress for the reorganization of education from bottom to top. Comparisons are forced with the European standards of universities, in effect beginning at a point corresponding to the close of the sophomore year of the American collegiate course. The rigid imposing of a separate graduate course upon the top of the established 4 years' collegiate curriculum in the case of the highly developed professions makes the age of the graduate from the professional school to be 26 or 27 years. The term of human life and the necessity for plasticity in the young professional man by common consent require him to be in practice at about 24; hence the pressure upon the entire educational system for reorganization. The first effect is within the university in making an organic rather than a mechanical relation between the graduate school and the undergraduate college. The second effect is the development of an organic relation between the first 2 years of the college and the high school.

The definition of a school recommended by the Association of American Universities and the National Association of State Universities as one requiring for admission to its work 2 years of collegiate preparation, and of a college as one requiring only 4 years of secondary preparation, is therefore not merely nominal.

The universities, in short, whether State-supported or endowed, are the inspirational heads of the school system, and the focal point for all the professions, and the correlating centers for all the organized intellectual activities of society.

Organically related to all society, the universities, themselves the result of processes of selection and emancipation as far as human institutions can be from political, commercial, and sectarian influences, are fitted to be influential standardizing agencies.

APPENDIX A.

DEFINITION OF REQUIREMENTS BY THE COLLEGE ENTRANCE EXAMINATION BOARD.

ENGLISH.

The requirement in English is that recommended by the National Conference on Uniform Entrance Requirements in English.

REQUIREMENT FOR 1912.

No candidate will be accepted in English whose work is notably defective in point of spelling, punctuation, idiom, or division into paragraphs.

(a) Reading and practice.

Two units.

A certain number of books will be recommended for reading, 9 of which, selected as prescribed below, are to be offered for examination. The form of examination will usually be the writing of a paragraph or two on each of several topics, to be chosen by the candidate from a considerable number—perhaps 10 or 15—set before him in the examination paper. The treatment of these topics is designed to test the candidate's power of clear and accurate expression, and will call for only a general knowledge of the substance of the books. In every case knowledge of the book will be regarded as less important than the ability to write good English. In preparation for this part of the requirement, it is important that the candidate shall have been instructed in the fundamental principles of rhetoric.

Group I (two to be selected). Shakespeare's *As You Like It*, *Henry V*, *Julius Caesar*, *The Merchant of Venice*, *Twelfth Night*.

Group II (one to be selected). Bacon's *Essays*; Bunyan's *The Pilgrim's Progress*, Part I; The Sir Roger de Coverley Papers in the *Spectator*; Franklin's *Autobiography*.

Group III (one to be selected). Chaucer's *Prologue*; Spenser's *Faerie Queene* (Book I); Pope's *The Rape of the Lock*; Goldsmith's *The Deserted Village*; Palgrave's *Golden Treasury* (First Series) Books II and III, with especial attention to Dryden, Collins, Gray, Cowper, and Burns.

Group IV (two to be selected). Goldsmith's *The Vicar of Wakefield*; Scott's *Ivanhoe*; Scott's *Quentin Durward*; Hawthorne's *The House of the Seven Gables*; Thackeray's *Henry Esmond*; Mrs. Gaskell's *Cranford*; Dickens's *A Tale of Two Cities*; George Eliot's *Silas Marner*; Blackmore's *Lorna Doone*.

Group V (one to be selected). Irving's *Sketch Book*; Lamb's *Essays of Elia*; De Quincey's *Joan of Arc* and *The English Mail Coach*; Carlyle's *The Hero as Poet*, *The Hero as Man of Letters*, and *The Hero as King*; Emerson's *Essays* (Selected); Ruskin's *Sesame and Lilies*.

Group VI (two to be selected). Coleridge's *The Ancient Mariner*; Scott's *The Lady of the Lake*; Byron's *Mazeppa* and *The Prisoner of Chillon*; Palgrave's *Golden Treasury* (First Series), Book IV, with especial attention to Wordsworth, Keats, and Shelley; Macaulay's *Lays of Ancient Rome*; Poe's *Poems*; Lowell's *The Vision of Sir Launfal*; Arnold's *Sohrab and Rustum*; Longfellow's *The Courtship of Miles Standish*; Tennyson's *The Princess*; Browning's *Cavalier Tunes*, *The Lost Leader*, *How They Brought the Good News from Ghent to Aix*, *Evelyn Hope*, *Home Thoughts from Abroad*, *Home Thoughts from the Sea*, *Incident of the French Camp*, *The Boy and the Angel*, *One Word More*, *Hervé Riel*, *Pheidippides*.

(b) Study and practice.

One unit.

This part of the examination presupposes the thorough study of each of the works named below. The examination will be upon subject matter, form, and structure. In addition the candidate may be required to answer questions involving the essentials of English grammar, and questions on the leading facts in those periods of English literary history to which the prescribed works belong.

A composition will also be set on a subject drawn from the candidate's studies other than English, or from his personal knowledge and experiences quite apart from reading.

The books set for this part of the examination will be:

Shakespeare's *Macbeth*; Milton's *Comus*, *L'Allegro*, and *Il Penseroso*, or Tennyson's *Gareth and Lynette*, *Lancelot and Elaine*, and *The Passing of Arthur*; Burke's *Speech on Conciliation with America*, or Washington's *Farewell Address* and Webster's *First Bunker Hill Oration*; Macaulay's *Life of Johnson*, or Carlyle's *Essay on Burns*.

REQUIREMENT FOR 1913, 1914, AND 1915.

Preparation in English has two main objects: (1) Command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence, and appreciation.

ENGLISH GRAMMAR AND COMPOSITION.

The first object requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, paragraphs, and the different kinds of whole composition, including letter writing, should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise narration, description, and easy exposition and argument based upon simple outlines. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge, and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

LITERATURE.

The second object is sought by means of two lists of books, headed, respectively, *Reading* and *Study*, from which may be framed a progressive course in literature covering four years. In connection with both lists, the student should be trained in reading aloud and be encouraged to commit to memory some of the more notable passages both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads and with their place in literary history.

(a) Reading.

Two units.

The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature, by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from which at least 10 units¹ are to be selected, 2 from each group:

I. The Old Testament, comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings, and Daniel, together with the books of Ruth and Esther; the Odyssey, with the omission, if desired, of Books I, II, III, IV, V, XV, XVI, XVII; the Iliad, with the omission, if desired, of Books XI, XIII, XIV, XV, XVII, XXI; Virgil's Aeneid. The Odyssey, Iliad, and Aeneid should be read in English translations of recognized literary excellence.

For any unit of this group a unit from any other group may be substituted.

II. Shakespeare's *The Merchant of Venice*; *Midsummer Night's Dream*; *As You Like it*; *Twelfth Night*; *Henry the Fifth*; *Julius Caesar*.

III. Defoe's *Robinson Crusoe*, Part I; Goldsmith's *The Vicar of Wakefield*; either Scott's *Ivanhoe* or Scott's *Quentin Durward*; Hawthorne's *The House of the Seven Gables*; either Dickens's *David Copperfield* or Dickens's *A Tale of Two Cities*; Thackeray's *Henry Esmond*; Mrs. Gaskell's *Cranford*; George Eliot's *Silas Marner*; Stevenson's *Treasure Island*.

IV. Bunyan's *Pilgrim's Progress*, Part I; *The Sir Roger de Coverley Papers* in the *Spectator*; Franklin's *Autobiography* (condensed); Irving's *Sketch Book*; Macaulay's *Essays on Lord Clive and Warren Hastings*; Thackeray's *English Humourists*; Selections from Lincoln, including at least the two Inaugurals, the Speeches in Independence Hall and at Gettysburg, the Last Public Address, and Letter to Horace Greeley, along with a brief memoir or estimate; Parkman's *Oregon Trail*; either Thoreau's *Walden* or Huxley's *Autobiography* and selections from *Lay Sermons*, including the addresses on *Improving Natural Knowledge*, *A Liberal Education*, and *A Piece of Chalk*; Stevenson's *Inland Voyage and Travels with a Donkey*.

V. Palgrave's *Golden Treasury* (First Series), Books II and III, with especial attention to Dryden, Collins, Gray, Cowper, and Burns; Gray's *Elegy* in a Country Churchyard and Goldsmith's *The Deserted Village*; Coleridge's *The Ancient Mariner* and Lowell's *The Vision of Sir Launfal*; Scott's *The Lady of the Lake*; Byron's *Childe Harold*, Canto IV, and *The Prisoner of Chillon*; Palgrave's *Golden Treasury* (First Series), Book IV, with especial attention to Wordsworth, Keats, and Shelley; Poe's *The Raven*, Longfellow's *The Courtship of Miles Standish*, and Whittier's *Snow Bound*; Macaulay's *Lays of Ancient Rome* and Arnold's *Sohrab and Rustum*; Tennyson's *Gareth and Lynette*, *Lancelot and Elaine*, and *The Passing of Arthur*; Browning's *Cavalier Tunes*, *The Lost Leader*, *How They Brought the Good News from Ghent to Aix*, *Home Thoughts from Abroad*, *Home Thoughts from the Sea*, *Incident of the French Camp*, *Hervé Riel*, *Pheidippides*, *My Last Duchess*, *Up at a Villa—Down in the City*.

(b) *Study.*

One unit.

This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. For this close reading are provided a play, a group of poems, an oration, and an essay, as follows:

Shakespeare's *Macbeth*; Milton's *L'Allegro*, *Il Penseroso*, and *Comus*; either Burke's *Speech on Conciliation with America*, or both Washington's *Farewell Address* and Webster's *First Bunker Hill Oration*; either Macaulay's *Life of Johnson* or Carlyle's *Essay on Burns*.

Examination.

However accurate in subject matter, no paper will be considered satisfactory if seriously defective in punctuation, spelling, or other essentials of good usage.

¹ Each unit is set off by semicolons.

The examination will be divided into two parts, one of which may be taken as a preliminary, and the other as a final.

The first part of the examination will be upon 10 units chosen, in accordance with the plan described earlier, from the lists headed *Reading*; and it may include also questions upon grammar and the simpler principles of rhetoric, and a short composition upon some topic drawn from the student's general knowledge or experience. On the books prescribed for reading, the form of the examination will usually be the writing of short paragraphs on several topics which the candidate may choose out of a considerable number. These topics will involve such knowledge and appreciation of plot, character development, and other qualities of style and treatment as may be fairly expected of boys and girls. In grammar and rhetoric, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors.

The second part of the examination will include composition and those books comprised in the list headed *Study*. The test in composition will consist of one or more essays, developing a theme through several paragraphs; the subjects will be drawn from the books prescribed for study, from the candidate's other studies; and from his personal knowledge and experiences quite apart from reading. For this purpose the examiner will provide several subjects, perhaps 5 or 6, from which the candidate may make his own selections. The test on the books prescribed for study will consist of questions upon their content, form, and structure, and upon the meaning of such words, phrases, and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their other works, and the periods of literary history to which they belong.

HISTORY.

The requirement in history is based on the recommendation of the committee of seven of the American Historical Association.

(a) *Ancient history*, with special reference to Greek and Roman history, and including also a short introductory study of the more ancient nations and the chief events of the early middle ages, down to the death of Charlemagne (814). One unit.

(b) *Medieval and modern European history*, from the death of Charlemagne to the present time. One unit.

(c) *English history*. One unit.

(d) *American history and civil government*. One unit.

The examination in history will be so framed as to require comparison and the use of judgment on the pupil's part rather than the mere use of memory. The examinations will presuppose the use of good textbooks, collateral reading, and practice in written work. Geographical knowledge will be tested by requiring the location of places and movements on an outline map.

LATIN.

The following requirements in Latin are in accordance with the recommendations made by the Commission on College Entrance Requirements in Latin, October, 1909.

I. AMOUNT AND RANGE OF THE READING REQUIRED.

1. The Latin reading, without regard to the prescription of particular authors and works, shall be not less in amount than Cæsar, Gallic War, I-IV; Cicero, the orations against Catiline, for the Manilian Law, and for Archias; Vergil, *Æneid*, I-VI.

2. The amount of reading specified above shall be selected by the schools from the following authors and works: Cæsar (Gallic War and Civil War) and Nepos (Lives); Cicero (orations, letters, and *De Senectute*) and Sallust (Catiline and Jugurthine War); Vergil (Bucolics, Georgics, and *Æneid*) and Ovid (*Metamorphoses*, *Fasti*, and *Tristia*).

II. SCOPE OF THE EXAMINATIONS.

1. *Translation at sight.* Candidates will be examined in translation at sight of both prose and verse. The vocabulary, constructions, and range of ideas of the passages set will be suited to the preparation secured by the reading indicated above.

2. *Prescribed reading.* Candidates will be examined also upon the following prescribed reading: Cicero, orations for the Manilian Law and for Archias, and Vergil, *Æneid*, I, II, and either IV or VI, at the option of the candidate, with questions on subject matter, literary and historical allusions, and prosody. Every paper in which passages from the prescribed reading are set for translation will contain also one or more passages for translation at sight, and candidates must deal satisfactorily with both these parts of the paper or they will not be given credit for either part.

3. *Grammar and composition.* The examinations in grammar and composition will demand thorough knowledge of all regular inflections, all common irregular forms, and the ordinary syntax and vocabulary of the prose authors read in school, with ability to use this knowledge in writing simple Latin prose.

Suggestions concerning preparation.

Exercises in translation at sight should begin in school with the first lessons in which Latin sentences of any length occur, and should continue throughout the course with sufficient frequency to insure correct methods of work on the part of the student. From the outset particular attention should be given to developing the ability to take in the meaning of each word—and so, gradually, of the whole sentence—just as it stands; the sentence should be read and understood in the order of the original, with full appreciation of the force of each word as it comes, so far as this can be known or inferred from that which has preceded and from the form and the position of the word itself. The habit of reading in this way should be encouraged and cultivated as the best preparation for all the translating that the student has to do. No translation, however, should be a mechanical metaphor; nor should it be a mere loose paraphrase. The full meaning of the passage to be translated, gathered in the way described above, should finally be expressed in clear and natural English.

A written examination can not test the ear or tongue, but proper instruction in any language will necessarily include the training of both. The school work in Latin, therefore, should include much reading aloud, writing from dictation, and translation from the teacher's reading. Learning suitable passages by heart is also very useful and should be more practiced.

The work in composition should give the student a better understanding of the Latin he is reading at the time, if it is prose, and greater facility in reading. It is desirable, however, that there should be systematic and regular work in composition during the time in which poetry is read as well; for this work the prose authors already studied should be used as models.

Subjects for examination.

As a tentative assignment of values 1, 2, 4, and 5 are counted as 1 unit each, 3 as 2 units, and 6 as $\frac{1}{2}$ unit; but 3 has no assigned value unless offered alone, 2 and 6 have no assigned values unless offered with 4 or 5, and in no case is the total requirement to be counted as more than 4 units.

It is understood that this assignment of values will be reconsidered after the requirements have had a year or two of trial.

1. *Grammar.* The examination will presuppose the reading of the required amount of prose (see I, 1 and 2), including the prose works prescribed (see II, 2).

2. *Elementary prose composition.* The examination will presuppose the reading of the required amount of prose (see I, 1 and 2), including the prose works prescribed (see II, 2).

3. *Second-year Latin.* This examination is offered primarily for candidates intending to enter colleges which require only 2 years of Latin or accept so much as a complete preparatory course. It will presuppose reading not less in amount than Cæsar, Gallic War, I-IV, selected by the schools from Cæsar (Gallic War and Civil War) and Nepos (Lives); but the passages set will be chosen with a view to sight translation. The paper will include easy grammatical questions and some simple composition.

4. *Cicero* (orations for the Manilian Law and for Archias) and *sight translation of prose.* The examination will presuppose the reading of the required amount of prose (see I, 1 and 2).

Vergil (Æneid, I, II, and either IV or VI, at the option of the candidate) and *sight translation of poetry.* The examination will presuppose the reading of the required amount of poetry (see I, 1 and 2),

6. *Advanced prose composition.*

GREEK.

The following requirements in Greek are selected in as close accordance with the recommendations of the American Philological Association as is practicable.

(a) i. *Grammar:* The topics for the examination in Greek grammar are similar to those detailed under Latin grammar.¹ (See p. 147.) One-half unit.

(a) ii. *Elementary prose composition,* consisting principally of detached sentences to test the candidate's knowledge of grammatical constructions.¹ One-half unit.

The examination in grammar and prose composition will be based on the first 2 books of Xenophon's *Anabasis*.

(b) *Xenophon:* The first 4 books of the *Anabasis*. One unit.

(c) *Homer—Iliad, I-III:* The first 3 books of the *Iliad* (omitting II, 494-end), and the Homeric constructions, form and prosody. One unit.

(f) *Prose composition,* consisting of continuous prose based on Xenophon and other Attic prose of similar difficulty. One-half unit.

(g) *Sight translation of prose* of no greater difficulty than Xenophon's *Anabasis*.

(h) *Sight translation of Homer.*

(ch) *Homer—Iliad, I-III, and sight translation of Homer.* One unit.

FRENCH.

The requirements in French follow the recommendations of the committee of twelve of the Modern Language Association.

(a) ELEMENTARY FRENCH.

(2 units.)

The aim of the instruction.

At the end of the elementary course the pupil should be able to pronounce French accurately, to read at sight easy French prose, to put into French simple English sentences taken from the language of everyday life or based upon a portion of the French text read, and to answer questions on the rudiments of the grammar as defined below.

The work to be done.

During the first year the work should comprise:

1. Careful drill in pronunciation.
2. The rudiments of grammar, including the inflection of the regular and the more common irregular verbs, the plural nouns, the inflection of adjectives, participles,

¹ Some of the colleges accepting the board's examinations consider Greek (a) i and Greek (a) ii as together constituting a single examination subject. Candidates for admission to such colleges should not offer one without the other.

and pronouns; the use of personal pronouns, common adverbs, prepositions, and conjunctions; the order of words in the sentence, and the elementary rules of syntax.

3. Abundant easy exercises, designed not only to fix in the memory the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression.

4. The reading of from 100 to 175 duodecimo pages of graduated texts, with constant practice in translating into French easy variations of the sentences read (the teacher giving the English) and in reproducing from memory sentences previously read.

5. Writing French from dictation.

During the second year the work should comprise:

1. The reading of from 250 to 400 pages of easy modern prose in the form of stories, plays, or historical or biographical sketches.

2. Constant practice, as in the previous year, in translating into French easy variations upon the texts read.

3. Frequent abstracts, sometimes oral and sometimes written, of portions of the text already read.

4. Writing French from dictation.

5. Continued drill upon the rudiments of grammar, with constant application in the construction of sentences.

6. Mastery of the forms and use of pronouns, pronominal adjectives, of all but the rare irregular verb forms, and of the simpler uses of the conditional and subjunctive.

Suitable texts for the second year are: About's *Le roi des montagnes*, Bruno's *Le tour de la France*, Daudet's easier short tales, La Bédollière's *La Mère Michel et son chat*, Erckmann-Chatrian's stories, Foa's *Contes biographiques*, and *Le petit Robinson de Paris*, Foncin's *Le Pays de France*, Labiche and Martin's *La poudre aux yeux* and *Le voyage de M. Perrichon*, Legouvé and Labiche's *La cigale chez les fourmis*, Malot's *Sans famille*, Mairat's *La tâche du petit Pierre*, Mérimée's *Colomba*, extracts from Michelet, Sarcey's *Le siège de Paris*, Verne's stories.

(b) INTERMEDIATE FRENCH.

(1 unit.)

The aim of the instruction.

At the end of the intermediate course the pupil should be able to read at sight ordinary French prose or simple poetry, to translate into French a connected passage of English based on the text read, and to answer questions involving a more thorough knowledge of syntax than is expected in the elementary course.

The work to be done.

This should comprise the reading of from 400 to 600 pages of French of ordinary difficulty, a portion to be in the dramatic form; constant practice in giving French paraphrases, abstracts or reproductions from memory of selected portions of the matter read; the study of a grammar of moderate completeness; writing from dictation.

Suitable texts are: About's stories, Augier and Sandeau's *Le gendre de M. Poirier*, Béranger's poems, Corneille's *Le Cid* and Horace, Coppée's poems, Daudet's *La Belle Nivernaise*, La Brète's *Mon oncle et mon curé*, Madame de Sévigné's letters, Hugo's *Hernani* and *La chute*, Labiche's plays, Loti's *Pêcheur d'Islande*, Mignet's historical writings, Molière's *L'avare* and *Le bourgeois gentilhomme*, Racine's *Athalie*, Andromaque and *Esther*, George Sand's plays and stories, Sandeau's *Mademoiselle de la Seiglière*, Scribe's plays, Thierry's *Récits des temps mérovingiens*, Thiers's *L'expédition de Bonaparte en Égypte*, Vigny's *La canne de jonc*, Voltaire's historical writings.

(c) ADVANCED FRENCH.

(1 unit.)

The aim of the instruction.

At the end of the advanced course the pupil should be able to read at sight, with the help of a vocabulary of special or technical expressions, difficult French not earlier than that of the seventeenth century; to write in French a short essay on some simple subject connected with the works read; to put into French a passage of easy English prose, and to carry on a simple conversation in French.

The work to be done.

This should comprise the reading of from 600 to 1,000 pages of standard French, classical and modern, only difficult passages being explained in the class; the writing of numerous short themes in French; the study of syntax.

Suitable reading matter will be: Beaumarchais's *Barbier de Séville*; Corneille's dramas; the elder Dumas's prose writings; the younger Dumas's *La question d'argent*; Hugo's *Ruy Blas*, lyrics and prose writings; *La Fontaine's Fables*; Lamartine's *Graziella*; Marivaux's plays; Molière's plays; Musset's plays and poems; Pellissier's *Mouvement littéraire au XIX^e siècle*; Renan's *Souvenirs d'enfance et de jeunesse*; Rousseau's writings; Sainte-Beuve's essays; Taine's *Origines de la France contemporaine*; Voltaire's writings; selections from Zola, Maupassant, and Balzac.

(bc) INTERMEDIATE FRENCH AND ADVANCED FRENCH.

(2 units.)

GERMAN.

The requirements in German follow the recommendations of the committee of twelve of the Modern Language Association.

(a) ELEMENTARY GERMAN.

(2 units.)

The aim of the instruction.

At the end of the elementary course in German the pupil should be able to read at sight, and to translate, if called upon, by way of proving ability to read, a passage of very easy dialogue or narrative prose, help being given upon unusual words and construction, to put into German short English sentences taken from the language of everyday life or based upon the text given for translation, and to answer questions upon the rudiments of the grammar, as defined below.

The work to be done.

During the first year the work should comprise:

1. Careful drill upon pronunciation.
2. The memorizing and frequent repetition of easy colloquial sentences.
3. Drill upon the rudiments of grammar, that is, upon the inflection of the articles, of such nouns as belong to the language of everyday life, of adjectives, pronouns, weak verbs, and the more usual strong verbs; also upon the use of the more common prepositions, the simpler uses of the modal auxiliaries, and the elementary rules of syntax and word-order.
4. Abundant easy exercises designed not only to fix in mind the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression.
5. The reading of from 75 to 100 pages of graduated texts from a reader, with constant practice in translating into German easy variations upon sentences selected from the

reading lesson (the teacher giving the English), and in the reproduction from memory of sentences previously read.

During the second year the work should comprise:

1. The reading of from 150 to 200 pages of literature in the form of easy stories and plays.

2. Accompanying practice, as before, in the translation into German of easy variations upon the matter read and also in the off-hand reproduction, sometimes orally and sometimes in writing, of the substance of short and easy selected passages.

3. Continued drill upon the rudiments of the grammar, directed to the ends of enabling the pupil, first, to use his or her knowledge with facility in the formation of sentences, and, secondly, to state his or her knowledge correctly in the technical language of grammar.

Stories suitable for the elementary course can be selected from the following list: Andersen's Märchen and Bilderbuch ohne Bilder; Arnold's Fritz auf Ferien; Baumbach's Die Nonna and Der Schwiegersohn; Gerstäcker's Germelshausen; Heyse's L'Arrabbiata, Das Mädchen von Treppi, and Anfang und Ende; Hillern's Höher als die Kirche; Jensen's Die braune Erica; Leander's Träumereien and Kleine Geschichten; Seidel's Märchen; Stökl's Unter dem Christbaum; Storm's Immensee and Geschichten aus der Tonne; Zschokke's Der zerbrochene Krug.

Good plays adapted to the elementary course are much harder to find than good stories. Five-act plays are too long. They require more time than is advisable to devote to any one text. Among shorter plays the best available are perhaps Benedix's Der Prozess, Der Weiberfeind, and Günstige Vorzeichen; Elz's Er ist nicht eifersüchtig; Wichert's An der Majorsecke; Wilhelmi's Einer muss heiraten. It is recommended, however, that not more than one of these plays be read. The narrative style should predominate. A good selection of reading matter for the second year would be Andersen's Märchen or Bilderbuch or Leander's Träumereien, to the extent of, say, 40 pages. After that such a story as Das kalte Herz or Der zerbrochene Krug; then Höher als die Kirche or Immensee; next a good story by Heyse, Baumbach, or Seidel; lastly Der Prozess.

(b) INTERMEDIATE GERMAN.

(1 unit.)

The aim of the instruction.

At the end of the intermediate course the pupil should be able to read at sight German prose of ordinary difficulty, whether recent or classical, to put into German a connected passage of simple English, paraphrased from a given text in German, to answer any grammatical questions relating to usual forms and essential principles of the language, including syntax and word formation, and to translate and explain (so far as explanation may be necessary) a passage of classical literature taken from some text previously studied.

The work to be done.

The work should comprise, in addition to the elementary course, the reading of about 400 pages of moderately difficult prose and poetry, with constant practice in giving, sometimes orally and sometimes in writing, paraphrases, abstracts, or reproductions from memory of selected portions of the matter read; also grammatical drill upon the less usual strong verbs, the use of articles, cases, auxiliaries of all kinds, tenses and modes (with special reference to the infinitive and subjunctive), and likewise upon word order and word formation.

Suitable reading matter can be selected from such works as the following: Ebner-Eschenbach's Die Freiherren von Gempferlein; Freytag's Die Journalisten and Bilder aus der deutschen Vergangenheit—for example, Karl der Grosse, Aus den Kreuz-

zügen, Doktor Luther, Aus dem Staat Friedrichs des Grossen; Fouqué's Undine; Gerstäcker's Irrfahrten; Goethe's Hermann und Dorothea and Iphigenie; Heine's poems and Reisebilder; Hoffmann's Historische Erzählungen; Lessing's Minna von Barnhelm; Meyer's Gustav Adolf's Page; Moser's Der Bibliothekar; Riehl's Novellen, for example, Burg Neideck, Der Fluch der Schönheit, Der stumme Ratsherr, Das Spielmannkind; Rosegger's Waldheimat; Schiller's Der Neffe als Onkel, Der Geisterseher, Wilhelm Tell, Die Jungfrau von Orleans, Das Lied von der Glocke, Balladen; Scheffel's Der Trompeter von Säckingen; Uhland's poems; Wildenbruch's Das edle Blut.

(c) ADVANCED GERMAN.

(1 unit.)

The aim of the instruction.

At the end of the advanced course the student should be able to read, after brief inspection, any German literature of the last 150 years that is free from any unusual textual difficulties, to put into German a passage of simple English prose, to answer in German questions relating to the lives and works of great writers studied, and to write in German a short independent theme upon some assigned topic.

The work to be done.

The work of the advanced course should comprise the reading of about 500 pages of good literature in prose and poetry, reference readings upon the lives and works of the great writers studied, the writing in German of numerous short themes upon assigned subjects, independent translation of English into German. Suitable reading matter will be: Freytag's Soll und Haben; Fulda's Der Talisman; Goethe's dramas (except Faust) and prose writings (say, extracts from Werther and Dichtung und Wahrheit); Grillparzer's Ahnfrau or Der Traum ein Leben; Hauff's Lichtenstein; Heine's more difficult prose (for example, Ueber Deutschland); Kleist's Prinz von Homburg; Körner's Zriny; Lessing's Emilia Galotti and prose writings (say, extracts from the Hamburgische Dramaturgie or Laokoon); Scheffel's Ekkehard; Schiller's Wallenstein, Maria Stuart, Braut von Messina, and historical prose (say, the third book of the Geschichte des dreissigjährigen Krieges); Sudermann's Johannes; Tieck's Genoveva; Wildenbruch's Heinrich.

(bc) INTERMEDIATE GERMAN AND ADVANCED GERMAN.

(2 units.)

SPANISH.

(2 units.)

The requirement in Spanish follows the form and spirit of the recommendations made for French and German by the committee of twelve of the Modern Language Association.

The aim of the instruction.

At the end of the elementary course the pupil should be able to pronounce Spanish accurately, to read at sight easy Spanish prose, to put into Spanish simple English sentences taken from the language of everyday life or based upon a portion of the Spanish text read, and to answer questions on the rudiments of the grammar, as defined below.

The work to be done.

During the first year the work should comprise:

1. Careful drill in pronunciation.
2. The rudiments of grammar, including the conjugation of the regular and the more common irregular verbs, the inflection of nouns, adjectives, and pronouns, and the elementary rules of syntax.

3. Exercises containing illustrations of the principles of grammar.
 4. The reading and accurate rendering into good English of from 100 to 175 duodecimo pages of graduated texts, with translation into Spanish of easy variations of the sentences read.

5. Writing Spanish from dictation.

During the second year the work should comprise:

1. The reading of from 250 to 400 pages of modern prose from different authors.
 2. Practice in translating Spanish into English and English variations of the text into Spanish.

3. Continued study of the elements of grammar and syntax.

4. Mastery of all but the rare irregular verb forms and of the simpler uses of the modes and tenses.

5. Writing Spanish from dictation.

6. Memorizing of easy short poems.

Suitable texts for the second year are: Valera's *El pájaro verde*; Alarcón's *El final de Norma*; Valdés's *José*; Galdós's *Doña Perfecta*, *Marianela*; Padre Isla's version of *Gil Blas*; Carrion and Aza's *Zaragüeta*.

MATHEMATICS.

The present definition of the requirements in mathematics is in accordance with recommendations made in September, 1903, by a committee of the American Mathematical Society.

(a) ELEMENTARY ALGEBRA—ALGEBRA TO QUADRATICS AND QUADRATICS AND BEYOND.

i. *Algebra to quadratics.*

One unit.

The four fundamental operations for rational algebraic expressions.

Factoring, determination of highest common factor and lowest common multiple by factoring.

Fractions, including complex fractions, and ratio and proportion.

Linear equations, both numerical and literal, containing one or more unknown quantities.

Problems depending on linear equations.

Radicals, including the extraction of the square root of polynomials and of numbers.

Exponents, including the fractional and negative.

ii. *Quadratics and beyond.*

One-half unit.

Quadratic equations, both numerical and literal.

Simple cases of equations with one or more unknown quantities, that can be solved by the methods of linear or quadratic equations.

Problems depending on quadratic equations.

The binomial theorem for positive integral exponents.

The formulas for the n th term and the sum of the terms of arithmetical and geometric progressions, with applications.

It is assumed that pupils will be required throughout the course to solve numerous problems which involve putting questions into equations. Some of these problems should be chosen from mensuration, from physics, and from commercial life. The use of graphical methods and illustrations, particularly in connection with the solution of equations, is also expected.

(b) Advanced algebra.

One-half unit.

Permutations and combinations, limited to simple cases.

Complex numbers, with graphical representation of sums and differences.

Determinants, chiefly of the second, third, and fourth orders, including the use of minors and the solution of linear equations.

Numerical equations of higher degree, and so much of the theory of equations, with graphical methods, as is necessary for their treatment, including Descartes's rule of signs and Horner's method, but not Sturm's functions or multiple roots.

(c) Plane geometry.

One unit.

The usual theorems and constructions of good textbooks, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle.

The solution of numerous original exercises, including loci problems.

Applications to the mensuration of lines and plane surfaces.

(d) Solid geometry.

One-half unit.

The usual theorems and constructions of good textbooks, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders, and cones; the sphere and the spherical triangle.

The solution of numerous original exercises, including loci problems.

Applications to the mensuration of surfaces and solids.

(cd) Plane geometry and solid geometry

One and one-half units.

(e) Trigonometry.

One-half unit.

Definitions and relations of the six trigonometric functions as ratios; circular measurement of angles.

Proofs of principal formulas, in particular for the sine, cosine, and tangent of the sum and the difference of 2 angles, of the double angle and the half angle, the product expressions for the sum or the difference of 2 sines or of 2 cosines, etc.; the transformation of trigonometric expressions by means of these formulas.

Solution of trigonometric equations of a simple character.

Theory and use of logarithms (without the introduction of work involving infinite series).

The solution of right and oblique triangles and practical applications, including the solution of right spherical triangles.

(f) Plane trigonometry.

One-half unit.

This subject is the same as the preceding except that no topics from spherical trigonometry are included.

The following are the recommendations of a conference of representatives of the departments of mathematics of 15 of the New England colleges and universities May 28, 1910:

They recommended to the colleges that they omit from their definitions of elementary algebra any topics which are not included in the College Entrance Examination Board's definition of that subject, and that they state their requirements in elementary

algebra in such a manner as to show which, if any, of the topics in the College Entrance Examination Board's definitions are omitted or are not emphasized by them. They recommended the adoption of the board's definitions of the requirements in plane geometry, solid geometry, plane and solid geometry, trigonometry, plane trigonometry, and advanced algebra, and that the members of the conference endeavor to persuade the faculties which they respectively represent to adopt these definitions. It was voted also that the conference recommend to the College Entrance Examination Board that no reduction in the time allowed to the individual subjects of mathematics in the examination schedule be made; but that mathematics *a* and mathematics *cd* continue to have 3 hours and that all other divisions of mathematics continue to have 2 hours each in the time schedule of the board's examinations. (Science, July 15, 1910, p. 77.)

PHYSICS.

One unit.

GENERAL STATEMENT.

1. The course of instruction in physics should include:

a. The study of one standard textbook, for the purpose of obtaining a connected and comprehensive view of the subject. The student should be given opportunity and encouragement to consult other scientific literature.

b. Instruction by lecture table demonstrations, to be used mainly for illustration of the facts and phenomena of physics in their qualitative aspects and in their practical applications.

c. Individual laboratory work consisting of experiments requiring at least the time of 30 double periods, 2 hours in the laboratory to be counted as equivalent to 1 hour of classroom work. The experiments performed by each student should number at least 30. Those named in the appended list are suggested as suitable. The work should be so distributed as to give a wide range of observation and practice.

The aim of laboratory work should be to supplement the pupil's fund of concrete knowledge and to cultivate his power of accurate observation and clearness of thought and expression. The exercises should be chosen with a view to furnishing forceful illustrations of fundamental principles and their practical applications. They should be such as yield results capable of ready interpretation, obviously in conformity with theory, and free from the disguise of unintelligible units.

Slovenly work should not be tolerated, but the effort for precision should not lead to the use of apparatus or processes so complicated as to obscure the principle involved.

2. Throughout the whole course special attention should be paid to the common illustrations of physical laws and to their industrial applications.

3. In the solution of numerical problems, the student should be encouraged to make use of the simple principles of algebra and geometry to reduce the difficulties of solution. Unnecessary mathematical difficulties should be avoided and care should be exercised to prevent the student from losing sight of the concrete facts in the manipulation of symbols.

SYLLABUS.

The following is a list of topics which are deemed fundamental and which should therefore be included in every well-planned course of elementary physics. Only a few of the most important applications of these topics have been mentioned; teachers should add liberally to them. It is expected that the teacher will arrange these topics in such order as will suit his individual needs.

I. INTRODUCTION: (*a*) Metric system—Linear measure, units—meter, centimeter, millimeter; square measure—square centimeter; cubic measure—cubic centimeter, liter; mass—kilogram, gram; (*b*) volume, weight, density; (*c*) states of matter—solids, liquids, gases.

II. MECHANICS: *Fluids*—(a) Pascal's law of fluid pressure; the hydraulic press; (b) pressure due to gravity; pressure varying with depth and density of the liquid; total pressure on the bottom of a vessel; (c) principle of Archimedes; (d) specific gravity of solids and liquids; (e) gases—relation between pressure and volume; (f) atmosphere pressure, buoyancy, the barometer, pumps for liquids and gases. *Solids*—(a) principle of moments; parallelogram of forces (resolution of forces, rectangular only); (b) Newton's laws of motion; force, momentum, velocity, acceleration; uniformly accelerated motion, when initial or final velocity is zero; falling bodies; (c) mechanical work; energy—potential and kinetic; conservation of energy; (d) Machines—principle of work applied to machines, mechanical advantage, friction, efficiency (use terms, effort, and resistance); lever, wheel and axle, pulleys, inclined plane; (e) uniform circular motion; centrifugal and centripetal forces qualitatively illustrated; (f) law of universal gravitation; relation of weight to mass; center of gravity; stability.

III. HEAT: (a) Heat—a form of energy; temperature, centigrade and Fahrenheit scales; (b) conduction, convection, and radiation; (c) expansion of solids, coefficient of linear expansion; expansion of liquids, anomalous expansion of water; expansion of gases, law of Charles, absolute zero; (d) change of state; fusion, the melting point; vaporization, boiling, evaporation; (e) measurement of heat, latent and specific heat; (f) mechanical equivalent of heat.

IV. SOUND: (a) nature and "origin of sound; (b) pitch, loudness, quality; (c) velocity; (d) reflection of sound, echoes; (e) resonance.

V. LIGHT: (a) definitions—light, luminous bodies, illuminated bodies, transparent, translucent, and opaque bodies; (b) rectilinear propagation of light in a homogeneous medium, shadows, pinhole camera; (c) photometry; intensity of light (source) and intensity of illumination distinguished; law of inverse squares; (d) reflection; law of reflection; regular and diffused reflection; plane and spherical mirrors, position and character of images; (e) refraction; laws of refraction (qualitative); refraction by plates, prisms and lenses; lenses—converging and diverging, conjugate foci, principal focus, principal axis; position and character of real and virtual images formed by converging lenses; dispersion, color and the spectrum; applications: the camera, the human eye, the compound microscope, the telescope.

VI. MAGNETISM: (a) Magnets, permanent and temporary; (b) polarity, magnetic attraction and repulsion; (c) magnetic induction, magnetic field and lines of force, permeability; (d) the earth as a magnet, compass, declination, dip.

VII. STATIC ELECTRICITY: (a) Electrification by friction; two kinds; (b) electrical attraction and repulsion; electroscopes; (c) conductors and insulators; electrification by induction; (d) condensers.

VIII. CURRENT ELECTRICITY: (a) Simple voltaic cell; electro-chemical action; local action and polarization; prevention of polarization; (b) types of cells (Daniel, Leclanché); (c) electrolysis; the ampere; electrolysis of water, electro-deposition of metals; storage cell; (d) electro-magnetism; magnetic field around a current; relation between direction of current and lines of magnetic force; electro-magnets, ampere turns (qualitative); the electric bell and the telegraph; (e) resistance; the ohm; ohm's law; the volt; power (the watt and the watt hour); (f) heating effects; fuse wire and electric heater; arc and incandescent lamps; (g) measuring instruments—galvanometer, ammeter, voltmeter, resistance box; (h) series and parallel connection of cells, lamps, etc.; (i) fall of potential in a circuit; (j) electro-magnetic induction; direction and magnitude of the induced electro-motive force; simple 2-pole dynamo and motor; simple alternating and direct current generator; transformer, induction coil, telephone.

LIST OF EXPERIMENTS.

MECHANICS:

1. Weight of unit volume of a substance, prism, or cylinder.
2. Principle of Archimedes.
3. Specific gravity of a solid body that will sink in water.
4. Specific gravity of a liquid, two methods (bottle and displacement methods); or,
5. Specific gravity of a liquid by balancing columns.
6. Boyle's law.
7. Density of air.
8. Hooke's law.
9. Strength of material.
10. The straight lever, principle of moments.
11. Center of gravity and weight of a lever.
12. Parallelogram of forces.
13. Four forces at right angles in one plane.
14. Coefficient of friction between solid bodies—on a level and by sliding on an incline.
15. Efficiency test of some elementary machine, either pulley, inclined plane, or wheel and axle.
16. Laws of the pendulum.
17. Laws of accelerated motion.

HEAT:

18. The mercury thermometer: Relation between pressure of steam and its temperature.
19. Linear expansion of a solid.
20. Increase of pressure of a gas heated at constant volume; or,
21. Increase of volume of a gas heated at constant pressure.
22. Heat of fusion of ice.
23. Cooling curve through change of state (during solidification).
24. Heat of vaporization of water.
25. Determination of the dew point.
26. Specific heat of a solid.

SOUND:

27. Velocity of sound.
28. Wave length of sound.
29. Number of vibrations of a tuning fork.

LIGHT:

30. Use of photometer.
31. Images in a plane mirror.
32. Images formed by a convex mirror.
33. Images formed by a concave mirror.
34. Index of refraction of glass; or,
35. Index of refraction of water.
36. Focal length and conjugate foci of a converging lens.
37. Shape and size of a real image formed by a lens.
38. Magnifying power of a lens.
39. Construction of model of telescope or compound microscope.

MAGNETISM AND ELECTRICITY:

40. Study of magnetic field.
41. Magnetic induction.
42. Study of a single fluid voltaic cell.
43. Study of a two fluid voltaic cell.
44. Magnetic effect on an electric current.
45. Electrolysis.

MAGNETISM AND ELECTRICITY—Continued.

46. Laws of electrical resistance of wires; various lengths, cross-section, and in parallel.
47. Resistance measured by volt-ammeter method.
48. Resistance measured by Wheatstone's bridge.
49. Battery resistance—combination of cells.
50. Study of induced currents.
51. Power or efficiency test of a small electric motor.

CERTIFICATE REQUIRED.

In lieu of the presentation of the laboratory notebook at the time of the examination the candidate must present a certificate in the following form:

Teacher's Certificate.

.....School.
.....19....

I certify that.....has personally performed and properly recorded in a suitable notebook.....experiments in the physical laboratory of the.....School, during the year.....

The entire course has occupied time equal to.....hours of 60 minutes each, of which.....hours have been given to the laboratory work andhours to lecture and recitation work.

Signed.....

Teacher of Physics.

The teacher may here enter the final grade of.....per cent.

CHEMISTRY.

(1 unit.)

The requirement in chemistry is based on the report of the committee on chemistry of the science department of the National Education Association.

The following outline includes only the indispensable things which must be studied in the classroom and laboratory. The material is, for the most part, common to all elementary textbooks and laboratory manuals. Each book makes its own selection of facts beyond those which may be necessary for the illustration of the principles of the science. The order of presentation will naturally be determined by the teacher.

Outline.—The chief physical and chemical characteristics, the preparation and the recognition of the following elements and their chief compounds: *Oxygen, hydrogen, carbon, nitrogen, chlorine, bromine, iodine, fluorine, sulphur*, phosphorus, silicon, potassium, sodium, calcium, magnesium, zinc, copper, mercury, silver, aluminum, lead, tin, iron, manganese, chromium.

More detailed study should be confined to the italicized elements (as such) and to a restricted list of compounds, such as: Water, hydrochloric acid, carbon-monoxide, carbon-dioxide, nitric acid, ammonia, sulphur dioxide, sulphuric acid, hydrogen-sulphide, sodium-hydroxide.

Attention should be given to the atmosphere (constitution and relation to animal and vegetable life), flames, acids, bases, salts, oxidation and reduction, crystallization, manufacturing processes, familiar substances (illuminating gas, explosives, baking powder, mortar, glass, metallurgy, steel, common alloys, porcelain, soap).

Combining proportions by weight and volume; calculations founded on these and Boyle's and Charles's laws; symbols and nomenclature (with careful avoidance of special stress, since these are nonessential); atomic theory, atomic weights and valency in a very elementary way; nascent state; natural grouping of the elements; solution (solvents and solubility of gases, liquids, and solids, saturation); ionization; mass action and equilibrium; strength (activity) of acids and bases; conservation and

dissipation of energy; chemical energy (very elementary); electrolysis. Chemical terms should be defined and explained, and the pupil should be able to illustrate and apply the ideas they embody. The theoretical topics are not intended to form separate subjects of study, but should be taught only so far as is necessary for the correlation and explanation of the experimental facts.

The facts should be given as examples from various classes, and not as isolated things. Thus, to speak of a "standard method of preparing hydrogen," whereby the action of zinc on hydrochloric acid is meant, shows narrow and infertile teaching. It should be shown that all acids are acted upon by certain classes of metals to produce hydrogen. Examples of both classes of metals should be given and the general principles derived. The reason for using zinc and hydrochloric acid in the laboratory can then be stated.

It is recommended that the candidate's preparation in chemistry should include:

- (1) Individual laboratory work, comprising at least 40 exercises selected from a list of 60 or more, not very different from the list given below.
- (2) Instruction by lecture-table demonstrations, to be used mainly as a basis for questioning upon the general principles involved in the pupil's laboratory investigations.
- (3) The study of at least one standard textbook, to the end that the pupil may gain a comprehensive and connected view of the most important facts and laws of elementary chemistry.

LIST OF EXPERIMENTS.

General—

1. Composition of the atmosphere.
2. Dissociation of mercuric oxide, and study of resulting products.
3. Burning of magnesium, sodium, and potassium in air, and of iron in oxygen, with study of resulting products.
4. Combination of substances produced in (3) with water, and study of results.
5. Burning of sulphur and phosphorus in air; study of products.
6. Combination of substances produced in (5) with water; study of products.
7. Treatment of substances resulting from (3) and (4) with hydrochloric acid, and examination of final products.

Laws of Gas Volumes and Vapor Tension—

8. Boyle's Law.
9. Charles's Law.
10. Vapor tension as related to temperature.

Common Elements and Compounds—

11. Preparation and study of oxygen.
12. Weight of a liter of oxygen under standard conditions.
13. Preparation of hydrogen by action of sodium on water. Careful study of by-product.
14. Preparation of hydrogen by zinc and acid. More thorough study of hydrogen in larger quantities. Study of by-product.
15. Weight of a liter of hydrogen under standard conditions. (Optional for best students.)
16. Proportion by weight in which hydrogen and oxygen unite. (Lecture demonstrations with eudiometer.)
17. Proportion by weight in which hydrogen and oxygen combine.
18. Study of boiling point, freezing point, action on litmus, and taste of substance produced by combining oxygen and hydrogen.
19. Electrolysis of water, resulting gases being accurately measured and tested.
20. Vapor density of water, conclusion as to formula for water. (Optional for best pupils.)
21. Study of sodium, potassium, lithium, strontium, calcium, and barium compounds. Detection of presence of these metals by flame tests and by spectroscopy.

Common Elements and Compounds—Continued.

22. Study of salts of cobalt, copper, nickel, manganese, chromium, iron. Tests for these metals and those mentioned in 21 in unknown mixtures.
23. Study of compounds of aluminum, magnesium, and zinc. Tests for these in mixtures of 21 and 22.
24. Tests for silver, lead, and bismuth in unknown mixtures of 21, 22, and 23.
25. Tests for mercury and arsenic in unknown mixtures of 21, 22, 23, and 24.
26. Preparation and study of chlorine gas.
27. Weight of a liter of chlorine.
28. Combustion of chlorine in hydrogen.
29. Preparation of hydrochloric acid and study of properties.
30. Decomposition of hydrochloric acid gas by sodium amalgam, and conclusions as to percentage composition. Avogadro's Law.
31. Preparation and study of at least 3 chlorides.
32. Preparation and study of bromine.
33. Preparation of at least 3 bromides.
34. Preparation and study of iodine.
35. Preparation of at least 3 iodides.
36. Comparative study of the chemism of chlorine, bromine, and iodine by mutual displacement.
37. Study of hydrofluoric acid and fluorides.
38. Determination of the combining proportion of chlorine and zinc and the atomic weight of zinc.
39. Atomic weight of zinc from specific heat. Law of Dulong and Petit.
40. Atomic weight of silver by displacement of zinc.
41. Study of forms of sulphur.
42. Direct formation of sulphides.
43. Study of sulphurous oxide.
44. Preparation of sulphurous and sulphuric acids.
45. Preparation of at least 2 sulphites and 2 corresponding sulphates. Comparative study of these.
46. Decomposition of ammonium nitrate and study of nitrous oxide.
47. To determine the composition of nitrous oxide. Gay-Lussac's Law.
48. Preparation and study of nitric acid.
49. Preparation of 3 nitrates in 3 different ways.
50. Composition of gas formed by action of cold dilute nitric acid on copper.
51. Composition of gas formed by union of nitric oxide and oxygen.
52. Preparation of chromic anhydride, chromic acid, and potassium chromate.
53. Changing potassium chromate to potassium bichromate and back again. Oxidation and reduction in solutions.
54. Chromium as an acid-forming and as a base-forming element. Preparation of chromium sulphate.
55. Preparation of ferrous and ferric salts.

Carbon and some Carbon Compounds—

56. Product of burning charcoal. Tests.
57. Test for presence of carbon in wood, paper, kerosene, coal gas, alcohol.
58. Preparation of three carbonates.
59. Solubility of carbonates in the presence of carbon dioxide.
60. Effect of heat on suspension of carbonates in solution.
61. Carbon dioxide from fermentation.
62. Alcohol from fermentation.
63. Preparation of ether by alcohol and sulphuric acid.
64. Preparation of alkaline salts of fatty acids, or soap making.

LABORATORY NOTEBOOK.

While the College Entrance Examination Board does not require the submission of the candidate's laboratory notebook as part of the examination in chemistry, it requires the submission of a teacher's certificate descriptive of the notebook. The notebook should be forwarded directly to the proper authorities of the college or scientific school which the candidate purposes entering. The notebook must contain:

- (1) A brief description in the pupil's own words of the materials and apparatus employed and the operations performed in each experiment, sketches being used to represent apparatus where this is practicable.
- (2) Records in the pupil's own words of phenomena as actually observed in the course of each experiment.
- (3) A statement of the important conclusions which may properly be drawn from the phenomena as observed.

Special importance should be attached to the evidence which the notebook affords of independent and careful thought on the part of the pupil, as indicated by ability to recognize and express clearly the significance of the work actually performed. Statements which have been merely transcribed from textbooks or manuals are by no means satisfactory. The notebook should contain an index of experiments.

CERTIFICATE REQUIRED.

In lieu of the presentation of the laboratory notebook at the time of the examination the candidate must present a certificate in the following form:

Teacher's Certificate.

(School).....
 (City).....
 (Date).....

I certify that during the academic year.....

 has personally performed and recorded in a suitable notebook.....
 experiments in the chemical laboratory of the.....School,
 the experiments being not very different from the list prescribed by the College
 Entrance Examination Board, and that the notebook constitutes a true and original
 record of the experiments.

The time given to the laboratory work has occupied hours and the time given
 to lectures and recitations has occupied hours.

(Signed).....

Teacher of Chemistry.

BOTANY.

(1 unit.)

The requirement in botany is based on the report of the committee on botany of the science department of the National Education Association, modified by a committee of the society for plant morphology and physiology (now merged with the Botanical Society of America).

The following course is designed to include those topics in the leading divisions of the subject which are now regarded by most teachers as fundamental. The general sequence of topics is that recommended, but this point is not regarded as especially important, and the sequence, the methods, and the textbooks are left to the judgment of the individual teacher. Where special circumstances, such as exceptional difficulty of obtaining material, etc., prevent the completion of the entire amount while allowing its equivalent in thoroughness, it is recommended that some of the minor topics here and there be omitted rather than that the attempt should be made to cover all more

superficially. To provide for this possibility the examination papers will always include a number of alternative questions.

Individual laboratory work by the students is essential and should receive at least double the amount of time given to recitation. In recording the laboratory work stress should be laid upon diagrammatically accurate drawing and precise expressive description.

While the College Entrance Examination Board does not require the submission of the laboratory notebook as part of the examination in botany, but expects that the notebook will be sent directly to the proper authorities of the college or scientific school which the candidate purposes entering, it requires the submission of a teacher's certificate covering the candidate's laboratory work. The blank form of the certificate required may be obtained from the secretary of the board.

The full year's course consists of two parts:

PART I. THE GENERAL PRINCIPLES OF (A) ANATOMY AND MORPHOLOGY, (B) PHYSIOLOGY, AND (C) ECOLOGY.

(A) *Anatomy and Morphology.*

The Seed.—Four types (dicotyledon without and with endosperm, a monocotyledon and a gymnosperm); structure and homologous parts. Food supply; experimental determination of its nature and value. Phenomena of germination and growth of embryo into a seedling (including bursting from the seed, assumption of position, and unfolding of parts).

The Shoot.—Gross anatomy of a typical shoot, including the relationships of position of leaf, stem (and root), the arrangement of leaves and buds on the stem, and deviations (through light adjustment, etc.), from symmetry. Buds and the mode of origin of new leaf and stem; winter buds in particular.

Specialized and metamorphosed shoots (stems and leaves). General structure and distribution of the leading tissues of the shoot; annual growth; shedding of bark and leaves.

The Root.—Gross anatomy of a typical root; position and origin of secondary roots; hair-zone, cap, and growing point. Specialized and metamorphosed roots. General structure and distribution of the leading tissues of the root.

The Flower.—Structure of a typical flower, especially of ovule and pollen; functions of the parts. Comparative morphological study of four or more marked types, with the construction of transverse and longitudinal diagrams.

The Fruit.—Structure of a typical fruit. Comparative morphological study of four or more marked types.

This comparatively morphological study of flowers and fruits may advantageously be postponed to the end of Part II, and then taken up in connection with classification of Angiosperms.

The Cell.—Cytoplasm, Nucleus, Sap-cavity, Wall.

(B) *Physiology.*

Rôle of water in the plant; *absorption (osmosis), path of transfer, transpiration, turgidity and its mechanical value, plasmolysis.*

Photosynthesis; *dependence of starch formation upon chlorophyll, light, and carbon dioxide; evolution of oxygen,* observation of starch grains.

Respiration; *necessity for oxygen in growth, evolution of carbon dioxide.*

Digestion; *digestion of starch with diastase,* and its rôle in translocation of foods.

Irritability; *geotropism, heliotropism, and hydrotropism.*

Growth; *localization in higher plants; amount in elongating stems; relationships to temperature.*

Fertilization; sexual and vegetative reproduction.

* * * * *

(C) *Ecology.*

Modifications (metamorphoses) of parts for special functions. Dissemination. Cross-pollination. Light relations of green tissue.

Special habitats: Mesophytes, Hydrophytes, Halophytes, Xerophytes; Climbers, Epiphytes, Parasites (and Saprophytes), Insectivora.

* * * * *

In this connection field work is of great importance, and for some topics is indispensable, though much may be done also with potted plants in greenhouses, photographs, and museum specimens. It is strongly recommended that some systematic field work be considered as an integral part of the course, coordinate in definiteness and value as far as it goes with the laboratory work. The temptations to haziness and guessing in ecology must be combated.

PART II.—THE NATURAL HISTORY OF THE PLANT GROUPS, AND CLASSIFICATION.

A comprehensive summary of the great natural groups of plants, based upon the thorough study of the structure, reproduction, and adaptations to habitat of one or two types from each group, supplemented and extended by more rapid study of other forms in those groups. Where living material is wanting for the latter, preserved material, and even good pictures, may be used, and a standard textbook should be thoroughly read. The general homologies from group to group should be noted, though it is not expected that these will be known in detail.

In general, in this part of the course, much less attention should be given to the lower and inconspicuous groups, and progressively more to the higher and conspicuous forms.

Following is a list of recommended types from which, or their equivalents, selection may be made:

(a) ALGÆ. Pleurococcus, Sphærella, Spirogyra, Vaucheria, Fucus, Nematium (or Polysiphonia or Coleochæte).

(b) FUNGI. Bacteria, Rhizopus or Mucor, Yeast, Puccinia (or a Powdery Mildew), Corn Smut, Mushroom.

Bacteria and Yeast have obvious disadvantages in such a course, but their great economic importance may justify their introduction.

(c) LICHENS. Physcia (or Parmelia or Usnea).

(d) BRYOPHYTES. In Hepaticæ, Radula (or Porella or Marchantia). In Musci, Mnium (or Polytrichum or Funaria).

(e) PTERIDOPHYTES. In Filicineæ, Aspidium or equivalent, including, of course, the prothallus. In Equisetineæ, Equisetum. In Lycopodineæ, Lycopodium, and Selaginella (or Isoetes).

(f) GYMNOSPERMS. Pinus or equivalent.

(g) ANGIOSPERMS. A monocotyledon and a dicotyledon, to be studied with reference to the homologies of their parts with those in the above groups; together with representative plants of the leading subdivisions and principal families of Angiosperms.

* * * * *

The preparation of an herbarium is neither required nor recommended, except as voluntary work for those with a taste for collecting. If made, it should not constitute a simple accumulation of species, but should represent some distinct idea of plant associations, or of morphology, or of representation of the groups, etc.

GEOGRAPHY.

(1 unit.)

The requirement in geography is based on the report of the committee on physical geography of the science department of the National Education Association.

The following outline includes only the most essential facts and principles of physical geography, which must be studied in the classroom and laboratory. The material

is, for the most part, common to the leading textbooks, though it should be recognized that no adequate laboratory manual is at present available. The order of presentation is not essential; it is recommended, however, that the topics be treated in general in the order given.

OUTLINE.—Recognizing that the field of physical geography in secondary schools should include (1) the earth as a globe, (2) the ocean, (3) the atmosphere, and (4) the land, the following outline is planned to cover these several large topics, with the further recommendation that the time allowance be proportionately increased in the order named:

The Earth as a Globe—

Shape of earth, how proved, consequences of shape.

Size: how earth is measured; effects of size.

Rotation: character of motion; latitude, longitude, and time.

Revolution: rate, path, direction, and the consequences.

Magnetism: compass, poles, variation.

Map projection.

The Ocean—

Form, divisions, and general characteristics of the ocean.

Depth, density, temperature of ocean waters.

Characteristics of ocean floor.

Distribution of life in oceans.

Movement of ocean waters: Waves—cause and effect; currents—causes, proofs of causes, important currents, effect of currents; tides—character of motion, cause of tides, variation of tides, bores.

Work of the ocean.

Classes of shore lines and importance of shore lines.

The Atmosphere—

Composition and offices of atmosphere.

Instruments used in study of atmosphere.

Temperature—Source and variation of atmospheric temperatures; isothermal charts of world, January and July, with special study of isothermals of northern and southern hemispheres, of location of heat equator, of cold pole, of crowded isotherms, etc.

Pressure—measurement of pressure; use of pressure in altitude determinations; relation to temperature; study of isobars on U. S. weather map; distribution of pressure over world in January and July; relations of isobars to isotherms.

Circulation of atmosphere—winds, classes, directions, causes, effects.

Moisture—source, forms, measurement, precipitation.

Storms—paths and characters of storms of United States; daily weather at different seasons; relation of storms to general weather conditions; relation of weather to climate.

The Land—

Several features of land as compared with ocean.

Distribution of land.

Map representation of topography.

Changes in land forms, effects of elevation and depression.

Plains—kinds of plains; characteristics of different kinds; development of plains; coastal plain of eastern United States in parts; alluvial plains, their formation and importance; relation of life conditions to different forms of plains.

Plateaus—young plateaus, dissected plateaus, old plateaus, broken plateaus.

Mountains—block, folded, domed, and massive mountains.

Volcanoes—distribution, character at different stages.

The Land—Continued.

Rivers—life history of river, work of rivers, topography of valleys at different stages, lakes and lake basins; revived rivers; drowned valleys; the great drainage basins of the United States.

Glaciers—existing ice sheets, kinds of glaciers, work of glaciers, characteristics of glaciated area of northern United States.

Summary—

Relation of man, plants, and animals, to climate, land forms, and oceanic areas.

The outline given can but present the larger topics to be covered, and in a way suggest the point of view desired. Each topic should be treated so as to show its causal relations to other topics, and, so far as possible, the effects of earth features on life conditions should be emphasized.

The candidate's preparation should include:

(1) The study of one of the leading secondary textbooks in physical geography, that a knowledge may be gained of the essential principles, and of well-selected facts illustrating those principles.

(2) Individual laboratory work, comprising at least 40 exercises selected from a list not very different from the one given below. From one-third to one-half of the candidate's classroom work should be devoted to laboratory exercises. In the autumn and spring field trips should take the place of laboratory exercises.

LIST OF POSSIBLE EXERCISES.¹

Earth as a Globe—

Construct a diagram showing inclination of earth's axis and effects of an axis at right angles and parallel to plane of orbit. [1]

Cause of day and night, and extent of sunlight over surface. [1]

Construct a diagram showing position of earth, moon, and sun at the several phases of moon. [1]

Construct a series of lines to some adopted scale, showing circumference and diameter of earth, and distance of several leading large cities from New York. [1]

Determination of latitude, north and south line, and high noon. [1]

Ocean—

Study of ocean current maps [1], tide charts [1], types of shore lines [1], positions of lighthouses, life-saving stations, and large cities in relation to southern Atlantic shore. [1]

Study of map of world, showing heights of land and depths of sea. [1]

Explain selected steamer routes across Atlantic and Pacific. [1]

Atmosphere—

Determination of altitude of hill by barometer. [1]

Determination of dew point. [1]

Comparison of January and July temperature of 40° N. and S. Lat. [2]

Location and migration of heat equator and cold pole. [2]

Comparison of temperature over land and water at different seasons. [2]

Study distribution of wind systems by seasons, and compare with pressure conditions. [2]

Make isotherm and isobar maps from furnished data. [2]

Find average wind directions about a storm center. [1]

Make complete weather maps from furnished data. [2]

Study distribution of cloudiness and rainfall about a storm center. [1]

Predict weather conditions from data furnished. [1]

Find average rate and direction of motion of storm centers. [1]

Study condition of "cold waves" and "northeasters." [1]

¹ Numbers in brackets indicate the value that should be given in estimating the total number of 40.

Land—

- Comparison of areas to scale. [1]
- Making cross-sections of contour maps to scale. [4]
- Cross-sections of hachure map, and changing hachure to contour map. [2]
- Writing description of models. [4]
- Writing description of picture and accompanying map. [2]
- Construction of river profile. [1]
- Making drainage map of United States. [1]
- Written description of selected maps illustrating classes of land forms. [4]
- Planning a journey and describing country to be seen. [1]
- Locating illustrations of common land forms on some special contour map. [1]
- Four excursions in autumn, described in detail. [8]
- Four excursions in spring, described in detail. [8]

The candidate's practical exercises should be distributed about as follows: Mathematical geography 5, ocean 5, atmosphere 12, land 18. In connection with them the candidate should prepare a notebook in which are recorded with dates the steps and the results of his laboratory exercises. This book should contain an index of subjects and should be a true and original record of the pupil's work.

While the College Entrance Examination Board does not require the submission of the laboratory notebook as part of the examination in geography, but expects that the notebook will be sent directly to the proper authorities of the college or scientific school which the candidate purposes entering, it requires the submission of a teacher's certificate covering the candidate's laboratory work.

ZOOLOGY.

(1 unit.)

The requirement in zoology is in accordance with the report of a committee appointed by the American Society of Zoologists.

The following outline includes the principles of zoology which are indispensable to a general survey of the science. It is not intended to indicate order of study of the topics—this must be left to the teacher and the textbook.

1. The general natural history—including general external structure in relation to adaptations, life histories, geographical range, relations to other plants and animals, and economic relations—of common vertebrates and invertebrates, so far as representatives of these groups are obtainable in the locality where the course is given.

The types suggested are a mammal, bird, lizard, snake, turtle, newt, frog, dogfish or shark, bony fish, clam, snail, starfish, earthworm, planarian, hydra, sea-anemone, paramaecium. In the case of arthropods, pupils should become familiar with common crustaceans, spiders, myriapods, and insects representing at least five orders.

Actual examination of common animals with reference to the above points should be supplemented by reading giving natural-history information. It is not expected that there will be time for making extensive notebooks on the natural-history work; rather will the work in this line take the form of laboratory demonstrations. So far as time permits, drawings and notes should be made. The notebook mentioned below should contain at least drawings on the external structure of four animals not studied under section 3, preferably two insects, a mollusk, and a second vertebrate.

2. The classification of animals into phyla and leading classes (except the modern subdivisions of the worms) and the great characteristics of these groups. In the case of insects and vertebrates the characteristics of the prominent orders.

The teaching of classification should be by practical work, so as to train the pupil to recognize animals and to point out the chief taxonomic characteristics. The meaning of species, genera, and larger groups should be developed by constructive practical work with representatives of insect or vertebrate orders.

3. The general plan of external and internal structure, not the anatomical minutiae, of one vertebrate (preferably frog or fish) in general comparison with human body); an arthropod (preferably a decapod); an annelid (earthworm or Nereis); a coelenterate (hydroid, hydra, or sea-anemone); a protozoon (a ciliate, and amœba when possible). In place of any of above types not locally available there may be substituted a second vertebrate, an insect, a mollusk, or an echinoderm. Tissues, the study of which is recommended as optional,¹ should be examined first with the unaided eye, in such a structure as a frog's leg, and then with a microscope demonstrate the relation of cells and intercellular substance in epithelium and cartilage; and, if possible, in other tissues. The functions of the chief tissues and their positions in the body of a vertebrate should be pointed out.

4. (i) The general physiology of above types, involving the essentials of digestion, absorption, circulation, respiration, cell metabolism, secretion, excretion, and nervous functions. This should apply comparatively the essentials of elementary work in human physiology. Demonstrations and experiments, such as are suggested in high-school textbooks on human physiology, should be introduced, or recalled if not previously well presented in elementary physiology, in connection with the discussion of the chief functions. As far as practicable structure and function should be studied together.

(ii) Comparison of the general life processes in animals and plants (in connection with botany if zoology is first studied).

5. The very general features of asexual reproduction of a protozoon (preferably *Paramœcium*); alternation of generations in hydroids; reproduction and regeneration of *Hydra*; the very general external features of embryological development in a fish or frog; and (optional) the general cellular nature (not centrosomes and the like) of germ cells, fertilization, and cell division in developing eggs should, as far as possible, be demonstrated and briefly described. Also, the most interesting features of development should be pointed out in the case of other animals studied.

6. The prominent evidence of relationship, suggesting evolution, within such groups as the decapods, the insects, and the vertebrates, should be demonstrated. A few facts indicating the struggle for existence, adaptation to environment, variations of individuals, and man's selective influence should be pointed out; but the factors of evolution and the discussion of its theories should not be attempted.

7. (Optional.) Some leading facts regarding the epoch-making discoveries of biological history and the careers of such eminent naturalists as Darwin, Huxley, Pasteur, and Agassiz should be presented.

The above outline of a course in general zoology should be developed on the basis of a course of laboratory study guided by definite directions. This should be supplemented by the careful reading of at least one modern elementary textbook in general zoology. At least two-thirds of the time should be devoted to the practical studies of the laboratory. If good nature studies have not preceded the course in high-school zoology, pupils should be encouraged to do supplementary work in the line of natural history. A notebook with carefully labeled outline drawings of the chief structures studied anatomically (section 3), and the drawings mentioned under natural history (section 1), and with notes on demonstrations and in explanation of drawings, with dates and an index, should be prepared by the candidate in connection with his practical work.

While the College Entrance Examination Board does not require the submission of the laboratory notebook, but expects that the notebook will be sent directly to the proper authorities of the college or scientific school which the candidate purposes entering, it requires the submission of a teacher's certificate covering the candidate's laboratory work.

¹ Topics marked "optional" are regarded as *desirable* for the best high-school zoology, but will not be required in examinations.

DRAWING.

(1 unit.)

The requirement in drawing is based upon the statement of entrance requirements in this subject as contained in the catalogues of colleges and universities represented in the College Entrance Examination Board.

The candidate's preparation should include freehand drawing of simple geometrical plane and solid figures and simple pieces of machinery, with a fair knowledge of the rules of perspective and light and shade as applied in freehand sketching. The candidate should be able to reproduce from a flat copy with enlargement or reduction of size.

For courses in architecture, the preparation should include, in addition to the above, the drawing of simple pieces of architectural ornament (a Greek anthemion, a design of iron scrollwork, etc.).

For courses in engineering, the preparation should include the copying of machinery details.

For courses in general science or in science for teachers, the preparation should include the copying of still life and simple plant forms.

Every candidate must present at the time of and as part of the examination in drawing a set of freehand drawings executed during a one-year course in a preparatory school and within a period of 2 years before the time of application for examination.

These drawings should be at least 20 in number, and should display the proficiency of the student in the following points:

1. Ability to sketch freehand from dictation with reasonable accuracy and with fairly correct steady and clean lines any simple geometrical figure or combination of figures, straight lines, squares and circles, polygons, spirals, or the like.

2. Ability to sketch from the object, with reasonable correctness of proportion, structure, and form, geometrical models, simple vases, simple details of machinery, or common objects, such as ordinary household furniture and utensils.

3. Ability to sketch from the copy, enlarging or reducing its dimensions, any simple object, such as a globe valve, stopcock, or any ordinary historical ornament, such as an acanthus leaf, egg and dart ornament, anthemion, tile pattern, iron scrollwork, or the like.

Correctness of proportion and accuracy in the angles and curves and structural relations of the parts of every figure or object drawn are of the highest importance, and great care should be taken in laying out the drawings, in the use of construction lines, and in the drawing of general masses and contour before the details are begun.

A certain proportion of shade drawings from casts may be included; but they are not required, and should not form the majority of the drawings submitted.

These drawings must be properly certified by the teacher, and the indorsement must, in effect, be as follows:

I certify that the accompanying drawings were actually executed by.....
 during the year 19...., while under systematic instruction in
 drawing in school.

.....
 Instructor in Drawing.

In case the candidate has not attended a systematic course of instruction as detailed above, he may submit a corresponding set of freehand drawings, duly certified by his instructor, or with his own signed declaration that the drawings are his own work.

MUSIC.

The requirement in music is based on the report of a joint committee representing the Eastern Educational Musical Conference and the New England Education League.

(a) MUSICAL APPRECIATION.

The board will hold a written examination on the first two parts of the following:

(1) A general knowledge of the principal musical forms—song, classic dance, fugue, sonata (all movements), symphony—and of their historical development.

(2) A general knowledge of the lives and environment of at least 10 composers, including Bach, Mozart, Beethoven, Schubert, Chopin, and 5 of the following: Purcell, Handel, Gluck, Haydn, Cherubini, Weber, Rossini, Glinka, Mendelssohn, Schumann, Wagner, Verdi.

(3) Familiarity with certain designated works. The works set for 1911 are:

Bach: Prelude I and Fugue I from the Well-Tempered Clavichord. Gavotte from Sixth Violoncello Suite.

Handel: Air with Variations ("The Harmonious Blacksmith").

Haydn: Largo from String Quartet (op. 74, No. 3).

Mozart: Overture to "The Magic Flute." Symphony in G Minor (entire).

Beethoven: Sonate Pathétique (op. 13, entire). Larghetto from Second Symphony. Allegro con Brio from Fifth Symphony.

Weber: Overture to "Der Freischütz."

Schubert: Moment Musical in F Minor (op. 94, No. 3). Song, "The Erl-King." Song, "Hark, Hark, the Lark."

Mendelssohn: Scherzo from "Midsummer Night's Dream." "Spinning Song" (op. 67, No. 4).

Chopin: Polonaise (op. 40, No. 1). Nocturne (op. 37, No. 2).

Schumann: "Aufschwung" (op. 12, No. 2). Song, "Im wunderschönen Monat Mai."

Wagner: Overture to "Tannhäuser." Siegfried's Funeral March, from "Götterdämmerung."

The College Entrance Examination Board will assign a rating on the written examination covering [1] and [2], upon the basis of which the college or university concerned will record a "provisional pass or a failure." A candidate who receives a "provisional pass" must take the examination in [3] at the institution which he or she elects to enter. In this latter examination the candidate will be expected to identify characteristic portions of the works set, when played by the examiner; and to give intelligent information concerning the form and character of the works themselves. The test will not require ability to perform, or to read from printed music.

(b) HARMONY.

(1 unit.)

The examination in harmony will consist only of a written test; there will be no test in performance. The candidate should have acquired:

(1) The ability to harmonize, in 4 vocal parts, simple melodies of not fewer than 8 measures, in soprano or in bass—these melodies will require a knowledge of triads and inversions, of diatonic seventh chords and inversions, in the major and minor modes; and of modulation, transient or complete, to nearly-related keys.

(2) Analytical knowledge of ninth chords, all nonharmonic tones, and altered chords (including augmented chords). [Students are encouraged to apply this knowledge in their harmonization.]

It is urgently recommended that systematic ear-training (as to interval, melody, and chord) be a part of the preparation for this examination. Simple exercises in harmonization at the pianoforte are recommended. The student will be expected to have a full knowledge of the rudiments of music, scales, intervals, and staff notation, including the terms and expression marks in common use.

(c) COUNTERPOINT.

(1 unit.)

The examination in counterpoint will consist only of a written test; there will be no test in performance. The candidate should have had training in pianoforte-playing sufficient to enable him to render the two-part inventions of Bach. The work should consist principally of written exercises on given or invented themes, as follows:

Chorals and melodies harmonized, with use of passing and ornamental tones; the several orders of counterpoint in 2, 3, and 4 voices, with and without *cantus firmus*; elementary practice in double counterpoint; imitative counterpoint in the style of the simpler 2-part and 3-part inventions and choral preludes of Bach; general and analytical study of contrapuntal compositions of larger scope, including detailed analysis (both as to harmonic scheme and as to contrapuntal treatment) of not less than 10 pages from at least 4 fugues of Bach's Well-Tempered Clavichord.

There should be some practice with the C clef in reading and in writing. Familiarity with the alto and tenor clefs is especially desirable.

APPENDIX B.

DEFINITIONS OF UNIT COURSES OF STUDY AND REQUIREMENTS IN CERTAIN SUBJECTS BY THE COMMISSION ON ACCREDITED SCHOOLS AND COLLEGES OF THE NORTH CENTRAL ASSOCIATION OF COLLEGES AND SECONDARY SCHOOLS.

UNIT COURSES IN GENERAL.

1. A Unit Course of Study in a Secondary School is defined as a course covering an academic year that shall include in the aggregate not less than 120 sixty-minute hours of classroom work, 2 hours of manual training or laboratory work being equivalent to 1 hour of classroom work.

2. A Unit Course of Study in the College is defined as a course covering an academic year that shall include in the aggregate not less than 150 sixty-minute hours of classroom work, at least 2 hours of laboratory, drawing, shop, or field work being equivalent to 1 hour of classroom work.

3. The graduation requirement of the high school and the entrance requirement of the college shall include 15 units as above defined.

4. All high-school curricula and all requirements for college entrance shall include as constants 3 units of English and 2 units of mathematics.

COLLEGE CREDIT FOR WORK DONE IN SECONDARY SCHOOLS.

1. The commission favors the general principle that colleges should give advanced credit for secondary-school work, when sufficient in amount and quality, done in addition to the 15 units required for admission.

2. In the opinion of the commission no advanced college credit should be given for less than 1 full year of secondary-school work in any subject, except so far as half units are specified in the definitions of unit courses, or for any study that is not pursued later than the second year of the high-school course.

3. The amount of advance credit to be awarded in any subject should be determined by the college which the student enters.

* * * * *

MATHEMATICS.

(3 units.)

A. Three chief aims should be set for instruction in mathematics in the secondary school:

1. To inspire and facilitate the acquisition of knowledge in an important field of human thought; mathematics is necessary to the comprehension and mastery of nature.

2. To develop the ability to apply this knowledge to practical and theoretical investigations.

3. To develop and strengthen the ability to perceive exact relations and to make inferences correctly; the teacher's constant aim should be to train the pupil to *think* and to formulate clearly the results of his thinking.

B. We may reasonably expect of students completing a high-school course and presenting themselves for admission to college:

1. A fair degree of accuracy and rapidity in calculations, and a fair knowledge of the applications of numbers to the solution of the common problems of life.

2. A fair degree of skill in making algebraic transformations.
3. The ability to use the equation as an instrument in the solution of problems.
4. The ability to interpret algebraic results.
5. A fair comprehension of what constitutes a proof in mathematics.
6. A good knowledge of the facts of elementary algebra and plane and solid geometry.

C. We recognize the fact that the students of the last high-school year, because of their greater maturity, have much more ability to grasp the abstract thinking of mathematics than do students of the first year. The material offered in the courses and the methods of instruction should be determined with this in view. At first the simpler and more concrete ideas of the subject should be dealt with. In later stages, more complicated mechanical work and formal theory should be introduced gradually.

D. The units, by title, shall be: (1) Algebra, first course, 1 unit; (2) plane geometry, 1 unit; (3a) algebra, $\frac{1}{2}$ unit; (3b) solid geometry; or (4) plane trigonometry, $\frac{1}{2}$ unit.

* * * * *

Under any arrangement arithmetic, algebra, geometry, and trigonometry should be regarded and treated as different phases of one and the same great subject—mathematics. The geometrical, the arithmetical, algebraic, and physical phases of mathematics should be presented as far as possible from the beginning to the end of the secondary course. Much can be done in this direction by employing geometrical methods in algebra and by using algebraic processes in geometry. Numerous examples taken from physics and problems illustrated graphically and taken from any source whatever may be advantageously employed.

E. The algebra required for entrance to college should include the following topics (no significance to be attached to the order given here):

1. The fundamental laws of algebra.
2. The general view of algebraic number.
3. The four fundamental operations as applied to integral, fractional, and irrational expressions.
4. Factoring.
5. Binomial theorem for positive integral exponents.
6. Solution of equations in 1 variable, including simple quadratic, fractional, and irrational equations.
7. Solution of systems of equation in 2 variables, including linear system, linear-quadratic system, and a few of the quadratic systems that occur more frequently in practice.
8. Ratio and proportion.
9. The statement and solution of problems.

It is recommended that this unit and a half be divided into two portions, an elementary course: Algebra 1, to be given in the first year of high school, and a more advanced course to be given after the course in plane geometry in the third or fourth year.

* * * * *

In plane geometry it is suggested that a clearer conception of geometrical reasoning and a firmer grasp upon geometrical facts can be acquired by a thorough consideration of a small number of theorems than by a hurried glance at a larger number. It is therefore recommended that the more important theorems be emphasized and that the less important be omitted or passed over without proof. It is suggested that teachers be free to assume the truth of some of the most evident theorems at first. Proof may be given later if desired. The original demonstration of theorems is of the utmost importance. The use of exercises involving algebraic and numerical applications is to be encouraged. The habit of giving accurate definitions, the perception of what constitutes a demonstration of truth, confidence in one's own power of correct reasoning and the ability to discover geometrical relations are of more impor-

tance than the ability to recall the demonstration of a large number of theorems. It would be well to omit the theory of limits and incommensurables from this course.

Solid geometry, 3b, should comprise the usual topics given in texts. Here, too, there should be a centering of attention upon the more important theorems. More emphasis should be placed on mensuration.

It may be desirable in some schools to rearrange the material of courses 2 and 3b so that course 2 should include the elements of both plane and solid geometry, leaving to course 3b the more difficult phases of the subject.

Plane trigonometry, 4, should include the definitions and relations of the six trigonometrical functions as ratios, the theory of logarithms and use of tables, the proof of important formulæ and considerable practice in trigonometric transformations; the solution of right and oblique triangles.

HISTORY.

(4 units.)

1. Ancient history, with special reference to Greek and Roman history, and including also a short introductory study of the more ancient nations and the chief events of the early Middle Ages, down to the death of Charlemagne (814).

2. Mediæval and modern European history, from the death of Charlemagne to the present time.

3. English history.

4. American history, or American history and civil government.

The periods that are here indicated as constituting the four units were recommended by the committee of seven of the American Historical Association in their report to the association in 1899. The full report is published under the title "The Study of History in Schools." It contains suggestions as to various methods of treating these periods, and gives further information likely to be of service to the teacher.

* * * * *

No definite statement need be made concerning the mode of teaching or the apparatus that should be used. But it may be said that the mere learning of a text will not give the preparation that the colleges desire. Happily the time is gone when teachers are inclined to confine their classes to the memorizing of a single text. Some colleges in their entrance examination expect the candidate to present notebooks showing the amount and character of the work done in the schools. It is desirable that notebooks or cards should be kept as a record of the work done. They may contain copious extracts from primary and secondary authorities, references to important material, sketch maps made by the pupils as illustrations of their studies, and informal notes on reading that has been done in connection with the course.

* * * * *

The teacher of history in the secondary school should have completed a four-year college course or the equivalent. He should have completed courses in history aggregating at least 12 hours for one year, including one "intensive" or "research" course. In the selection of these courses at least 3 fields of history represented in the secondary school units should be chosen. It is also strongly recommended that the teacher should have pursued elementary courses in economics and political science.

The school library or an accessible public library should be equipped with at least the following numbers of well-selected books on the different units: Ancient history, 25 volumes; Mediæval and modern history, each 25 volumes; English history, 50 volumes, and United States history, 75 volumes.

In addition to a good textbook, the pupil should have read in connection with each unit of history as a minimum the following amounts of carefully selected collateral material, of which at least one-fourth should be source material: Ancient history, 200 pages; mediæval and modern European history, each 150 pages; English history, 300

pages; American history, 350 pages. (It is understood that civics is additional.) Especial care should be exercised by the teacher in testing the reports on outside reading to see that the best results are obtained.

PHYSICS.

(1 unit.)

1. The unit in physics consists of at least 180 periods of 45 minutes each (equal to 120 hours) of assigned work. Two periods of laboratory work count as one of assigned work.

2. The work consists of 3 closely related parts, namely, class work, lecture-demonstration work, and laboratory work. At least one-fourth of the time shall be devoted to laboratory work.

3. It is very essential that double periods be arranged for the laboratory work.

4. The class work includes the study of at least one standard text.

5. In the laboratory the student shall perform at least 30 individual experiments, and shall keep a careful notebook record of them. At least 20 of these should involve numerical work and the determination of such quantitative relations as may be expressed in whole numbers. Such quantitative work should aim to foster the habit of thinking quantitatively, but should not attempt to verify laws with minute accuracy nor to determine known physical constants with elaborate apparatus. The list of topics covered by these quantitative experiments should not differ widely from the list of starred topics in the syllabus.

6. The class work should aim to build up in the student's mind clear concepts of physical terms and quantities, and an intuitive appreciation of the general principles which make up the syllabus. He must be trained in the use of those principles in the solution of simple, practical, concrete numerical problems.

7. Examinations will be framed to test the student's understanding of and ability to use the general principles in the required syllabus, as indicated in 6.

8. The teacher is not expected to follow the order of topics in the syllabus unless he wishes to do so.

This list of required topics is not intended to include all the material for the year's work. It is purposely made short in order that each teacher may be free to supplement it in a way that fits his individual environment. It does include those topics which all agree are essential to a first course in physics and which are capable of comprehension at least to the extent specified in number 6 of the definition of the unit by boys and girls of high-school age.

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CHEMISTRY.

(1 unit.)

Chemistry is an art as well as a science. Acquaintance with its elements includes ability to do certain things intelligently as well as remembrance of the bare results of chemical changes. An organized account of the latter is only a sort of desiccated residuum if it is not illuminated by the experience acquired along with skill in the former. The books usually—and necessarily—give prominence to the second (the systematic aspect), leaving instruction in the art to the teacher. A requirement in chemistry, on the other hand, must emphasize the art, for it is universal. It will lay less stress on any particular list of substances, reactions, or topics, in view of the extent of the available material, the briefness of the school course, and the consequent differences between equally good individual selections. The art can not, of course, be acquired without a fair systematic knowledge, while a semblance of the systematic knowledge may be acquired without the art. The art is therefore more worthy of emphasis.

It will be noted that the art of chemistry consists in the practical knowledge of the physical properties of all kinds of matter and the utilization of this knowledge in arranging intelligently the conditions before chemical change, in noting all physical indications during experiment and distinguishing the significant ones, and in interpreting the result of this observation. It thus deals almost exclusively with physical conceptions and facts. It demands, therefore, a careful training in physical facts, physical observation, and physical inference. Conventionalized chemical work which can progress without skill in this art (for example, reiterated observation of precipitations) is valueless.

Disregarding questions of order, and simply classifying the essential principles of instruction, the pupil should be taught:

1. *Technique of experimentation.* Properties of common apparatus in respect to structure and material. For example, how to make an apparatus air tight and why. Object of such operations as washing and drying gases and how the object is attained.

Physical properties which may be used for recognition of each substance and for explanation of all observations.

Judicious use of proportions and materials. Influence of conditions (temperature, homogeneous and heterogeneous mixture, etc.) on chemical change.

2. Physical phenomena, their recognition, description, and physical interpretation.

3. The more strictly *chemical application* of the results. For example, inference in regard to the nature of the chemical change which must have led to the results observed. Making of the chemical equation from adequate data.

* * * * *

A knowledge of important chemical industries and ability to work simple problems will be expected.

BOTANY.

(1 unit.)

It has been the intent of the committee to prepare a statement that is sufficiently elastic to give adequate recognition to all good courses in high-school botany, rather than to present a set line of procedure that must be followed by all. The work that is done should meet the needs of the pupils regardless of whether any work is to be done in any higher institution. Emphasis is placed upon the quality and quantity of the work done, and upon the preparation of the teacher, rather than upon the particular things that are to be done.

* * * * *

The committee wishes to express its appreciation of the work done by the committee on education of the Botanical Society of America. This committee, previously working as the committee of the society of plant morphology and physiology of the College Entrance Examination Board, and later of the Botanical Society of America, has published 4 reports, the latest in the *School Review* for November, 1908. These reports have been most potent in giving purpose and organization to the teaching of botany in secondary schools.

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- I. The purpose and content of the course and the time that should be given to it.

1. The ends to be sought through an elementary study of plant life include training in the scientific method of thinking, particularly as relates to plant life, information and a more intelligent and a more active interest in natural phenomena in general, an elementary knowledge of fundamentals of plant life, and a better understanding of those features and activities of plants that relate to everyday affairs.

2. In determining the content, order, and treatment of topics in any individual course, the needs and opportunities of the teacher and class should be dominant. To this end this statement includes the general features of the course, the teacher being left at liberty to adopt such details as best meet the needs of any particular

class of pupils. The quality and quantity of work done by the pupil, evidence of his ability to do accurate and reliable work, and adequate preparation by the teacher, rather than the specific content of the course, are emphasized.

3. There is presented a general plan of the "synthetic course," which the majority of the committee believes to be the best type, though it is not intended to restrict teachers to this type of course. This course embodies the elements of morphology of the great groups including the "lower forms" as well as the seed plants; of physiology, with experiments upon plant activities; of ecology, with emphasis upon class and individual field trips, including some acquaintance with local plants; of the relation of plants to their habitat and to men; of food and timber supply, parasitism, disease, decay, soil replenishment, etc. It is recommended, however, that plants be studied in an elementary way leading into any or all of the above aspects, rather than that the differentiated divisions of the subject be taken up at one time.

An elementary consideration of the relations of plants to men as shown in plant and animal diseases, hygiene, agriculture, horticulture, erosion, decay, foods, fibers, etc., should be presented as an organic part of the study of botany. The inclusion of these practical matters as an organic part of the course, rather than as a number of sections upon the applied aspects of plants, gives appreciable meaning and fuller significance to the study. An adequate consideration of such separate applied sciences as agriculture, forestry, bacteriology, and horticulture should follow the general study of plants and animals.

4. The time requirement of the course should be the equivalent of 180 periods of at least 40 minutes each; there should be two doubled periods per week for laboratory or field work, each of these doubled periods counting as one period in making up the total 180 periods.

II. Suggested plan of the course. This is a plan for a synthetic course. It suggests more material than any one year's work can present. Some of the topics will receive more emphasis at the hands of teachers who prefer to treat briefly or omit other topics, the ones selected for full or brief treatment varying with different teachers. In order of treatment consideration may first be made of the structure and function of seed plants, or of the characteristics of the great groups of plants.

* * * * *

III. The qualifications of the teacher of botany.

It is believed that the teacher of botany in the high school should have a minimum preparation in botany equivalent to 2 years of college work. This work should include the general morphology of the lower and higher groups, elementary plant physiology and ecology; zoology, physiography, and a course in general bacteriology are desirable. The teacher should also have some knowledge of the purpose of botany in high-school education and of current and desirable practice in teaching botany.

Since the teacher of botany usually teaches other sciences each demanding somewhat similar quantity of preparation, obviously to maintain this standard more general and more extensive preparation needs to be urged. This standard of preparation is deemed highly desirable in order to give botany its proper place in secondary education, but it may not always be practicable. It is the standard that should be met by those who are now preparing to teach the subject.

ZOOLOGY.

(1 unit.)

A high-school course in zoology should have for its objects: (1) To acquaint the student with the common animals of his own neighborhood, with the various environments of these animals, with the adaptations which the animals show to their environment, and with their habits and economic importance. (2) To afford training in critical methods of making and recording observations both by drawing and by

writing, both in the laboratory and in the field. (3) To teach enough of the interpretation of the observed facts that the student may understand the current methods of interpretation from the morphological, physiological, and ecological standpoints. In other words, with the study of the structures there should go an interpretation of their use (physiology, ecology) and of their past history (evolution). An elementary training in both experimental and comparative methods should be sought, and the peculiar value of such training as a means of intellectual development should not be overlooked. Ability on the part of the student to observe and think independently is especially desired.

For a course extending through the year with 4 periods per week, it is recommended that the laboratory and field work consist of the study of at least 10 type forms as indicated in the following list:

An insect, the crayfish, an earthworm, leech, or fresh-water oligochaete, an Amoeba or other protozoan, hydra or a hydroid, a mussel or snail, a fish, a frog or turtle, a bird, a mammal.

The animal to be taken as the type under each head may be selected by the teacher and will vary with the locality. It will usually be most convenient to begin with insects in the fall and to take up birds before the spring migration, and mammals later in the spring or in the winter. The order in which the other forms are studied may vary according to convenience. In the above list the crayfish and the earthworm have been placed after the insect in order to bring like forms together. Those who find difficulty in beginning with a form as small as the grasshopper may prefer to spend the first 2 weeks on the crayfish, but any considerable delay in taking up insects in the fall should be avoided. The other forms are arranged in the usually accepted logical order which is preferred by most teachers. If, for practical reasons, it is deemed best to depart from this order, it will be found that the idea of evolution may be taught with quite as much force from material within the individual groups as by an adherence to the so-called logical order of the groups themselves.

If time permits, the teacher may profitably add to the list of types an echinoderm and a sponge, to each of which one or two class and laboratory periods may be devoted. The student's conception of the animal kingdom is thus greatly broadened.

A suitable laboratory and field equipment is assumed. Its precise character will vary with circumstances. In general the better the equipment the better the work that may be done. While it is true that a course in zoology may be given without the use of the compound microscope, in the opinion of your committee a much better course may be given by its moderate use.

As far as possible the work on each type should be begun by collecting by the students, chiefly of the type form but incidentally of as many as possible of other forms belonging to the same group. Some of the animals collected should be kept alive, and the subsequent study should, where practicable, be made on living animals. The work on each type should include structure, behavior and habits, study of related forms, and ecology.

The plan recommended for laboratory and field work may be best made clear by a specific illustration. Thus the work on insects may be begun with the grasshopper, with a collecting trip in which each individual student is required to bring into the laboratory as many kinds of grasshoppers as he can obtain, and together with these a certain number of insects belonging to other groups. Each student should then preserve most of the insects in his collection and after sorting them put them aside for future use. In this connection instruction may be given in methods of pinning and preserving insects and encouragement may be given the pupil to make his own collection. Many of the grasshoppers collected should be kept alive and their study now be undertaken. In this study function and structure should as far as possible be considered in connection with one another. Thus the student may observe the

ways of walking, hopping, and flying, and in connection with these may study on preserved material the structure of the legs and wings. At the same time he may be instructed in the classroom and by the aid of models, preparations, and diagrams concerning muscles and the movements produced by them. Similarly he may study the use of the mouth parts in feeding and may then observe the structure of the mouth parts in greater detail. From this he may proceed to a study of the structure of the digestive organs either from his own dissections or from preparations and charts. The teacher may then give elementary instruction concerning the process of digestion. Again, observations may be made on the breathing movements to be followed by an anatomical study of the spiracles and tracheae and an exposition of the nature of respiration. Thus in all cases, so far as practicable, close correlation should be made between the work on the function and that on the structure of the various parts of the body.

* * * * *

The class should next make a comparative study of the different grasshoppers collected so as to be able to distinguish the different species in a second field excursion. When a good conception has been gained of the general structure of the body and of the chief functions of its part, and when a sight recognition of the local species of grasshoppers is assured, attention may be directed to the life of grasshoppers in the field and to the adaptations shown by the various species to their conditions of existence (ecology).

When the field work on the grasshopper has been completed, the class should take up the insects on the first field excursion and should become familiar with the principal groups of insects. At this point attention may be directed to the economic value of certain species. Here, again, opportunity will be afforded to stimulate individual work and the making of collections.

The same plan of work may be followed in considerable detail with the mollusca. In the case of other groups the field work may need to be considerably modified. Thus birds and mammals may not be collected, but both may be studied in the field. Protozoa and hydra may be collected, but are not, of course, suitable for field study. In the case of each type the plan outlined should be followed in so far as the nature of the material permits. It is believed that in the laboratory the plan is feasible in nearly every case.

* * * * *

The importance of proper field and laboratory notes and drawings should be emphasized. Notes, both in field and laboratory, should be made while the work is in progress, not afterward. They should be criticized by the teacher with reference to their pertinence and completeness and should be permanently preserved. Such notes may be made the basis of more careful reports, which should be criticized with a reference to the arrangement of their contents, the character of their conclusions, and their English. It is suggested that teachers of English will often be found willing to cooperate in the correction of such reports. Drawing is of no less importance than note taking. Drawings should be made chiefly in the laboratory and always from the specimen. It should be the object of the teacher to see that the drawings are accurate and that their details have meaning. Meaningless or ambiguous lines or masses of shade have no more place in a scientific drawing than meaningless words in a sentence.

Attention should also be called to the importance of local school museums. These should contain primarily representatives of the local fauna attractively displayed. Students may be referred to specimens in such a museum as they are referred to books and may use the museum as they would a library. The Michigan Academy of Sciences maintains a bureau the purpose of which is to secure for teachers and others the identification of specimens collected by them and their exchange for other specimens. Information concerning the bureau may be had from the secretary of the academy, Mr. George Schäfer, Agricultural College, Michigan.

The following recommendations are also made:

1. That the course be put in the second high-school year, rather than in the first, and that it be preceded by a course in physiography.
2. Each week's work should consist of 2 class exercises and at least 2 laboratory exercises. Each laboratory exercise should consist of at least 2 school periods, and these should, if possible, be the last 2 periods of the afternoon.

COMMERCIAL SUBJECTS.

(7 units.)

a. BUSINESS ARITHMETIC ($\frac{1}{2}$ UNIT).

The object is first of all absolute accuracy, and secondly speed, in ordinary business computations. To secure these essentials, not less than half of each recitation should be devoted to mental drill on simple exercises. For the same reason, no credit whatever should be allowed on work involving any error in computation; and a rigid time limit should be set for all written work.

* * * * *

Textbook, supplemented by numerous live exercises from current sources, such as stores, trade papers, etc. The methods should be planned so as to arouse and sustain interest. "The class work must touch life and breathe the spirit of business."

b. ELEMENTARY BOOKKEEPING (1 UNIT).

The technical business subjects, especially bookkeeping and stenography, are vocational in purpose and must therefore be taught with a view to practical mastery. This fact should suggest and control the method. For example, no credit whatever should be allowed unless the work is done neatly, accurately, and at a satisfactory rate of speed. And there should be a combination of class and individual methods of instruction to secure maximum results. In order to establish sound habits, it is also well to provide double periods for elementary bookkeeping, and require all work to be done in the classroom under the eye of the instructor.

The first requisite is a good, clear, business handwriting. Unless pupils have it, which they rarely do, they should be required to do a prescribed amount of practice writing under the supervision of the instructor.

Definitions of double-entry terms, with rules for debit and credit, kinds and uses of books. Conduct of a set, including the journal, cash-book, sales-book ledger, check book, bank pass book, and trial-balance book; closing of books. Single-entry set; changing from single to double entry.

Textbook, with exercises so arranged that no two pupils will do exactly the same work.

c. ADVANCED BOOKKEEPING AND BUSINESS USAGE (1 UNIT).

Thorough drill on the preparation and interpretation of standard business forms, such as bills, receipts, checks, notes, time and sight drafts, acceptances, indorsements, invoices, accounts sales, deposit tickets, warehouse receipts, express receipts, bills of lading, statements of account, balance sheets, etc.

Explanation of business symbols and abbreviations.

Bill book, invoice book, special books, loose-leaf and voucher systems of bookkeeping.

Each student is to carry on a business of his own, manufacturing, banking, wholesale, retail, jobbing or commission; at first as an individual, then as a partnership, finally as a corporation, thus involving the use of several forms of accounts.

Credit on this course should mean that the school is ready to vouch for the student as one thoroughly versed in the principles and practice of bookkeeping, who lacks only actual business experience to become a competent bookkeeper.

d. BUSINESS LAW ($\frac{1}{2}$ UNIT).

The object of this study is not to make "every man his own lawyer," but rather to enable him to keep out of legal complications. Ignorance of the law excuses no one.

To this end it is necessary to study the legal principles governing business relations, especially contracts, their nature, essentials, and effects; further, sales, interest and usury, bills and notes, agency, partnership, corporations, real property and mortgages, liens, attachments, surety and guarantyship, bailments, common carrier, banking, fire insurance, landlord and tenant.

Textbook, supplemented by some study of cases (by way of illustration), discussions and practice in drawing legal papers, such as a contract, note, bill of exchange, bill of sale, bill of lading, power of attorney, deed, mortgage, lease, notice of protest, etc.

e. STENOGRAPHY AND TYPEWRITING (2 UNITS).

This work is expected to occupy not less than 2 periods daily for 2 years. No credit should be given for either shorthand or typewriting if taken alone.

The "touch" method is strongly recommended in typewriting.

The object is first, accuracy, and second, speed in taking dictation and transcribing notes. Equally essential are correct spelling, capitalization, punctuation, and paragraphing.

No credit should be given unless the following speed is attained: At end of first year, 75 words per minute in dictation and 25 words per minute on the machine; at end of second year, 500 words in 5 minutes in dictation, and 35 words per minute in the transcription of notes.

Thorough training should also be given in care of the machine and in methods of copying, manifolding, and filing papers.

f. BUSINESS SPELLING AND CORRESPONDENCE ($\frac{1}{2}$ UNIT).

Preliminary review of 500 common business words. Thorough drill on business correspondence, including (1) Form of business letters, beginnings and endings, etc.; (2) choice of words and structure of sentences with reference to clearness and brevity; (3) capitalization, punctuation, and paragraphing; (4) writing and answering telegrams and advertisements.

If the pupil does not write a clear and neat business hand, he should be required to make good his deficiency, or no credit should be granted for the course.

Textbook, supplemented by letters relating to the most prominent industries of the locality.

g. HISTORY OF COMMERCE ($\frac{1}{2}$ UNIT).

Knowledge of the past is indispensable to an understanding of the present. The history of commerce thus forms the natural introduction to the study of present economic conditions. It should, however, follow the usual course in ancient, medieval, and modern history.

The principal commodities, centers, and routes of commerce in successive ages; relation to stage of economic development, division of labor, means of transportation and communication; markets and fairs, their functions in commerce; special attention to England and the United States; and to the growth of modern colonial empires.

Textbook, supplemented by map work and assigned readings.

h. ECONOMIC HISTORY OF ENGLAND ($\frac{1}{2}$ UNIT).

A study of English history, with special reference to the causes and effects of her economic development. It should be based on some of the smaller economic histories, such as Cheyney, Price, or Cunningham and McArthur.

This course, where given, will naturally follow the courses in general European history, and may take the place of the usual political English history.

i. ECONOMIC HISTORY OF THE UNITED STATES ($\frac{1}{2}$ UNIT).

A study of American history with special attention to the economic factor. It should be based on some textbook such as Wright, Coman, or Bogart, supplemented by collateral readings, especially in books such as Semple and Brigham on geographic influences.

This course will naturally follow the one on English history and may take the place of the usual political American history.

j. MATERIALS OF COMMERCE ($\frac{1}{2}$ UNIT).

A study of the most important foodstuffs and raw materials which enter extensively into commerce, with special reference to their source, mode of preparation, and principal uses.

A course supplementary to commercial geography. Textbook, study of specimens and pictures, collateral reading, visits of inspection. The introduction of this subject is not recommended unless samples can be provided of at least two dozen of the chief commercial staples in various stages of preparation.

k. COMMERCIAL GEOGRAPHY ($\frac{1}{2}$ UNIT).

As the history of commerce is concerned with the past of commerce, so commercial geography describes and seeks to explain the geographic distribution of industries and the resulting course of commerce to-day. It is "a comparative study of the nations of the world, their commercial prominence, and their contest for the trade of the world."

The introductory work should cover: (1) The effect of surface, soil, climate, etc.; that is, the physical factor in commerce; (2) the influence of race, religion, education, commercial policies, etc.; that is, the human factor in commerce; (3) the effect of economic forces on production and commerce; (4) means of transportation and communication.

Following this should come a detailed study of the United States by sections and then as a whole, with reference to physical features and climate, natural resources, population, leading industries, transportation facilities, and commerce, especially foreign commerce; then a study of the outlying possessions of the United States; and finally, a survey of the other important commercial countries from the same viewpoint.

Textbook, supplemented by map work and assigned readings. For purposes of illustration, samples of commercial staples, lantern slides, stereopticon pictures, etc., should be freely employed; and whenever possible visits of inspection should be made and informal lectures secured by experts in various industries. Should be preceded by physical geography in case both physical and commercial geography are taken.

l. ELEMENTARY ECONOMICS ($\frac{1}{2}$ UNIT).

The study of economics is indispensable if the business man is to understand the process in which he has a part, and the tendencies which are at work in the business world of to-day.

In the high school it is necessary to avoid two extremes: The one, abstract theory; the other, controversial questions. While not omitting theory, emphasis should therefore be placed on historical and descriptive matter.

Textbook, with collateral readings, especially on the economic history of England and the United States. In the selection of texts it is well to avoid large and difficult books intended for college classes.

MANUAL TRAINING.

(12 units.)

Manual training comprises a systematic study of the manual arts, embracing (1) the mechanic arts (shopwork, drawing); (2) household arts (sewing, cooking); (3) freehand drawing and applied arts.

The minimum time given per year in order to count as a unit should not be less than the equivalent of 240 hours of 60 minutes. No superior limit is given, but additional hours should not receive additional credit.

a. SHOPWORK (4 UNITS).

Every exercise which is involved in what follows should be planned and executed to illustrate an important mechanical principle or process, or a combination of such principles and processes.

The exposition of a tool and the demonstration of a process should be before the entire section of pupils conveniently seated so as to see all that the teacher does and hear all that he says.

The shop period of first-year boys ought not to exceed 100 minutes in length; but third and fourth year pupils can profitably have longer but less frequent shop periods. However, those periods should never exceed 180 minutes.

Pupils should never be left out for themselves the proper ways of using a tool. The correct ways should be clearly and fully shown and explained. The use of a wrong tool, and the adoption of an illogical or unscientific procedure should at once be checked, and the error should be plainly pointed out.

b. BENCH WORK (1 UNIT).

(a) Fundamental tool processes: Measuring, squaring, gauging, sawing, boring, chiseling; rules for planing. (b) Constructions involving groove joints and halving; laying out and cutting joints; use of nails, screws, and glue; carving and finishing. (c) Making a glue joint; planing joints, gluing, clamping, surfacing, sandpapering. (d) Construction by means of mortise-and-tenon joint; laying out duplicate parts, cutting mortise, sawing tenon, gluing and clamping, scraping, finishing. (e) Construction involving the miter joint; planing parallel edges and sides in the construction of a miter box; rabbeting, laying out and cutting a brace. (f) Dovetailing: Laying out and cutting dovetails, planing corners, inlaying. (g) Construction involving the use of the panel: Plowing, fitting, gluing, clamping, putting on hinges, finishing.

c. Wood-turning and elementary metal-working (1-unit).

I. Wood turning. Use of different kinds of wood. Care of lathe. (a) Turning spindle, cylinder, taper, convex curve, concave curve, compound curve; turning to given dimensions, finishing and polishing in the lathe. (b) Faceplate turning. (c) Chuck turning; built-up stock, fitting.

II. Metal working. Working in a variety of metals, including cast-iron, steel, brass, tin, zinc, and copper. (a) Chipping and filing; chipping with cold chisel and hammer; filing, testing, tool dressing. (b) Making small tools. Drilling, filing, fitting, riveting, finishing. (c) Construction in sheet metal; pattern cutting, bending, folding, wiring, soldering. (d) Copper work: sawing, beating, hard soldering, repoussé, annealing, coloring with heat and chemicals, etching. (e) Turning: Hand-tool turning, filing in lathe, polishing in lathe, thread cutting with tap and die, hardening, tempering, annealing. (f) Spinning: cutting templet, turning form in wood to fit templet, spinning zinc or Britannia metal and copper, polishing, lacquering.

d. Pattern making, molding and forging (1 unit).

The theory and use of patterns, how built, how divided and why; pattern-making, bench-molding of simple and complex patterns; theory and use of cores, construction of cores and core-prints; casting with lead and alloys.

Construction and management of the forge—fundamental processes; drawing, upsetting, bending, punching, splitting, welding, hardening; shaping steel under the hammer; tempering of different grades; the construction of chains, hooks, and forge tools, and wrought-iron articles from original or selected designs; finally the manufacture of a set of standard steel lathe tools. The design and actual construction of a piece of ornamental and useful wrought-iron or steel work.

e. Bench and machine metal fitting (1 unit).

Theory of metal-turning, centering; forms of cutting tools and tool-grinding; turning cast-iron, wrought iron, steel, and brass; use of oil, relation of speed to heat developed; use of taps and dies; screw cutting, chuckwork, mandril and faceplate work; drilling, slotting, planing, gear cutting, and special work on the milling machine. Having mastered the elements, each student should combine more or less of such elements in a construction, made in accordance with original or selected drawings.

f. Drawing (2 units).

In all pencil drawing with instruments, great care should be taken to make sharp lines with accurate intersections. Do not delay precision till ink is used.

I. (a) Straight lines; use of T-square, triangles, pencil, ruling pen, dividers, and scale. Conventional lines. Free-hand working sketches. (b) Circles. Use of compasses, center lines, cross hatching. (c) Tangents. Location of centers and points of tangency. (d) Planes of projection; elementary principles of projection; revolution of the planes of projection. Projections of simple geometric figures. (e) Revolution of objects. "Views" of objects in simple and inclined positions. (f) Developments: prism, cylinder, pyramid, cone. (g) Intersections. Axes in the same plane, axes in different planes. (h) Isometric and cabinet drawing. (i) Freehand and mechanical lettering; placing, form, slant, spacing, stroke. (j) Working drawings; furniture. (k) Working drawings; machine parts.

II. (a) Mechanical perspective. (b) Freehand drawing in perspective. (c) Construction of conic sections and helix. (d) Line shading. (e) Wash drawing. (f) Designing for metal work. (g) Either machine or architectural drawing.

Household arts and science (4 units).

Plain sewing (1 unit). Every exercise in sewing should illustrate an important principle or process, or a simple combination of such principles and processes. Hand sewing and sewing machine work must be equally insisted upon.

- (a) The various stitches and their special uses.
- (b) Hand sewing, fundamental processes.
- (c) The use and care of sewing machines and their attachments.
- (d) The nature and special uses of cotton, linen, and woolen goods.
- (e) The use of patterns; cutting out.
- (f) Taking measurements; making of simple garments.

2. Sewing and millinery (1 unit).

- (a) Making of shirt waists, wash dresses, and similar garments.
- (b) Millinery: Study of materials for hats; making, altering, and covering hat frames. The planning, making, and trimming of seasonable hats of appropriate materials.

Throughout the course economy and good taste in dress.

Cooking (2 units).

1. Food classified and tested for food principles.

A study of the effect of heat upon foods alone and in combination; with and without water and other liquids; experiments with leavening agents, and their uses shown in actual cooking. Bread making. The theory and practice of canning and preserving fruits, vegetables, and meats. Planning, cooking, and serving meals. Waiting on table.

2. The cost of food; market prices; the cost of meals. Household accounts. The family dietary: The planning, weighing, and cooking of apportioned meals. Diets for infants, invalids, and convalescents.

Sanitation: Selection of site, house planning; heating, lighting, and ventilating; water supply; disposal of waste; furnishing and decorating; cleaning processes, including laundry work.

Freehand drawing and applied arts (2 units).

Approximately one-third the time should be given to representative drawing and two-thirds to decorative composition, constructive and decorative design, construction and applied design.

(a) Pictorial—Plant study (flowers, sprays of leaves, seeds, pods, etc.); object study; landscape—roof studies, buildings, etc.; pose drawing; composition.

(b) Decorative composition—Plant forms, object study, landscape pose.

(c) Decorative design—Plant analysis (for the purpose of design; conventionalized plant forms; decorative units, borders, surfaces, corners, rosettes, posters, bookcovers, etc.; stencils, wood-block printing; historic ornament; arrangement of straight lines, and of straight and curved lines; geometric design; lettering—illuminating; schemes for interior decoration.

(d) Constructive design—Designs for pottery, leather, metal, bookbinding, furniture, cardboard construction, textiles, etc.

(e) Crafts—Pottery, leather work, metal work, bookbinding, furniture. (Choice of one or more of the above crafts.)

(f) Applied design—Design applied to the crafts and to cardboard, textiles, etc.

(g) Illustration.

(h) Talks on history of industry and art, on civic planning, domestic architecture and decoration.

(i) Instrumental drawing to be given as needed to meet the requirements of practical designing and construction.

NOTE.—Mediums used: Pencil, charcoal, water colors, crayons, brush, and India ink, and a combination of the pure mediums.

APPENDIX C.

SOME STANDARDIZING AGENCIES.

American Academy of Medicine.
American Conference of Pharmaceutical Faculties, 1910.
American Dental Faculties Association.
American Federation of Arts.
American Historical Association.
American Institute of Homeopathy.
American Mathematical Society.
American Pharmaceutical Association.
American Philological Association.
American Society on Engineering Education.
American Society of Zoologists.
Association of American Law Schools, 1910-11.
Association of American Medical Colleges.
American Medical Association (Council on Medical Education, 1910).
Association of American Universities.
Association of Colleges and Preparatory Schools of the Middle States and Maryland.
Association of Colleges and Preparatory Schools of the Southern States, 1911.
Association of Collegiate Alumnae.
Carnegie Foundation for the Advancement of Teaching, 1910.
College Entrance Examination Board, 1910.
Confederation of State Medical Examination Boards.
Dental Faculties Association of American Universities, 1910.
Eastern Educational Musical Conference.
Methodist Episcopal Church Board of Education, 1911.
Methodist Episcopal Church South Board of Education, 1911.
Modern Language Association.
National Association of Dental Examiners.
National Association of State Universities, 1910.
National Conference Committee on Standards of Colleges and Secondary Schools.
National Conference on Uniform Entrance Requirements in English.
National Dental Association.
National Education Association (various committees and departments).
New England Association of Colleges and Preparatory Schools.
New England College Certificate Board.
New England Education League.
New York State Education Department.
North Central Association of Colleges and Secondary Schools, 1911.
Society of Mechanical Engineers.
State boards of educational examiners.
State licensing boards.
Western Drawing and Manual Training Association.

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